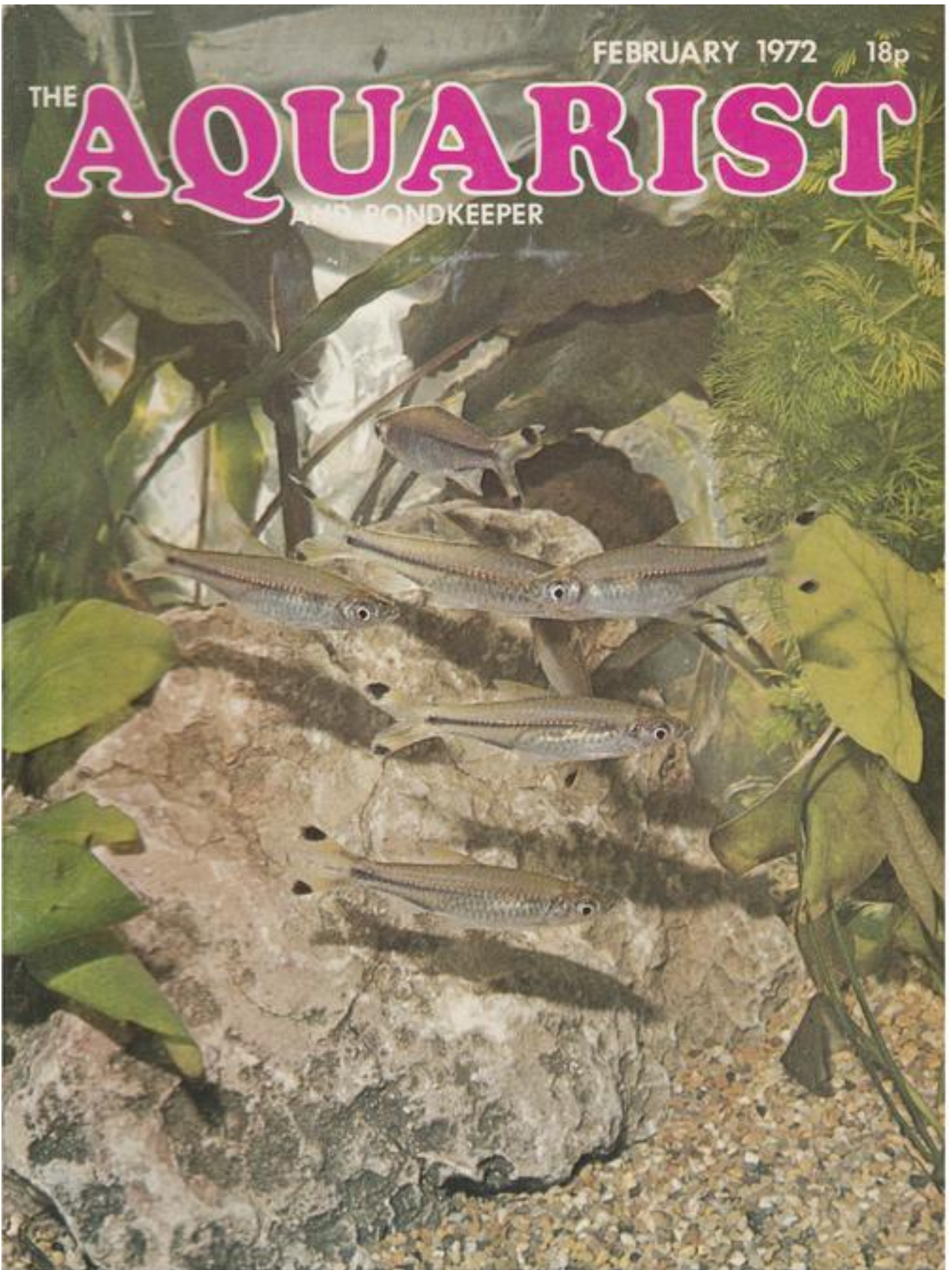


FEBRUARY 1972 18p

THE **AQUARIST**
AND PONDKEEPER





THE AQUARIST

AND PONDKEEPER

Published Monthly 18p

Printed by Buckley Press,
The Butts, Half Acre,
Brentford, Middlesex.
Telephone: 01-568 8441

Subscription Rates:
The Aquarist will be sent post
free for one year to any address
for £2.71. Half-yearly £1.36

MSS, or prints unaccompanied
by a stamped addressed
envelope cannot be returned
and no responsibility is accepted
for contributions submitted.

Founded 1924
as "The Amateur Aquarist"
Vol. XXXVI No. 11, 1972

Editor: Laurence E. Perkins
Advertisement Manager:
J. E. Young

Contents

	PAGE
Ultra-violet Sterilisation for Discus	358
Crossword Puzzle	360
British Freshwater Fish: The Burbot	361
What is Your Opinion?	362
<i>Chalcus macrolepidotus</i>	365
<i>Cichlasoma severum</i>	366
Book Reviews	367
Help—For the Worker	368
Ornamental Plants	369
Crossword Puzzle Solution	371
Biological Filtration	372
Herpetological Notes	374
More about Happy Vics	376
Our Experts' Answers: Tropical Queries	378
Goldwater Queries	379
Our Readers Write	382
Product Review	383
Breeding the Neon Tetra	384
Colour in Goldfish and Koi	386
The Silver Needlefish	387

Our Cover
Rasbora trilineata
(Singapore Hill)

The Editor accepts no responsibility for views expressed by contributors.

February, 1972

357

Ultra-violet Sterilization

For Discus

by R. H. Cooke

I MENTIONED in an earlier article that the aim of every aquarist must be the health of the fish. Correct diets to which the fish have become accustomed must be maintained together with adequate living space. The temperature must similarly be controlled together with lighting to provide a near natural state. The water: fresh water; that magic substance without which no fish can live, must be as clean and as clear as a moon-beam; the Germans refer to it as *subwasser* or sweet water and sweet it must be if our fish are to enjoy the health they must have if we are to get pleasure from their presence.

How can we make water sufficiently pure and clean to sustain even the most exacting requirements of Discus fish, *ramerizi* and chocolate Gourami, not to mention many other species outside the scope of domestic management? We can demineralize it to remove the dissolved solids or ion-exchange it, we can aerate it to drive off carbon-dioxide and ammonia, we can pass it through wool and activated carbon to absorb colour and organic waste, or pass it through peat moss to acidify it, at the same time adding unknown doubtful beneficiaries; we can sterilize it by heat or ultra violet radiation and subject it to under-gravel biological decomposition. Let us now consider the merits and disadvantages of these methods of control.

Demineralizers will certainly remove the dissolved solids; they will not remove bacteria, neither will they cause a build-up of bacteria in the tank if the water is allowed only to pass once through them; they are essential for most soft-water applications. Water softeners or exchange resins left in circulation have no established benefits and provide a breeding ground for bacterial growth. I do not encourage their use and in my opinion they should only be used as preparators for demineralizers.

Aerators are the hobbyist's best friend. However,

the air should be discharged into a perforated tube to prevent turbulence as many fish object to violent aeration which may also prevent suspended dirt from settling where it can be conveniently removed. Wool and carbon filters, particularly power filters, do a great job in removing colour, odour, suspended debris and organic waste; they are also the collecting house for parasites, bacteria, dead leaves, decomposed food, *daphnia* and small fish. They are the aquarium sewage works through which we go to a great deal of trouble to pass every millilitre of water in the tank. Cleaned daily they are a great asset. Peat filters fall into the same category as above. However, they do provide acidification which will deter bacterial growth for a short period of time. Sterilization, by raising the water to 140°F (without fish please), will give you a clean start; however this sterility is short-lived but all water added for topping up should be so treated before use. Sterilization by ultra violet is economical, continuous, trouble-free, calling for minimum maintenance in the aquarium and enables other types of filters to be used for long periods without attention. The pH will be of less importance since acid water will no longer contribute towards the control of bacteria. Under-gravel filters are becoming ever increasingly popular since this method is nature's own way of decomposing waste. This biological process is carried out under the gravel and out of sight providing we flush it with a continuous supply of fresh aerated water.

If we examine this list we will see that all these methods of filtration can safely be used providing we continuously sterilize the water or sterilize it sufficiently to keep the bacterial count down to a safe level. However, it would be undesirable to incorporate all of these controls at the same time as some become unnecessary and others, such as biological decompositions, would cease to function. Imagine passing peat

acid sterilized water through the gravel bed; all you accomplish in this state is a carpet of gravel under which you sweep your dirt. Allowing the water to remain neutral or slightly alkaline will, however, produce a very healthy state of affairs.

I have not mentioned ozone as in my experience it is very difficult to control and lethal in slight overdoses for it may encourage the growth of tumours, especially in young fish.

My first interests in ultra violet sterilization took place many moons ago when a man walked into my workshop with a bandage over his eyes. He complained that his work involved mercury discharge lamps and that he had severe conjunctivitis. I was determined at that point to start a campaign to blind unwanted bugs in my fish tanks. My ignorance at that time of the effects of ultra violet, however, led me to do the right thing for the wrong reason. The effect of ultra violet on living organisms is far more subtle than blinding them with science.

The nucleus of a living cell contains a substance known as deoxyribonucleic acid or DNA and it is this molecule which becomes affected such that the cell is unable to reproduce itself.

At that time mentioned, very few germicidal ultra violet lamps were available and so frequently my course of lamp manufacturing experiments led me to disappointment, frustration and sore eyes. The very short wave-length of these invisible ultra violet waves is measured in angstrom units (\AA) and 2,540 \AA s provide the peak germicidal effect.

Outside the 2-3,000 \AA the ultra violet wave band is still very broad, so the chances of an untrained village lad (as I was at that time) hitting the jackpot with a home made tube is about equal to a one-armed blind man in a dark room trying to stuff a pound of melted butter into a wild cat's left ear with a red hot needle, and even if you manage to get the tube pressure right, the gas right and the internal construction right, the chances of transmission of that ultra violet wave-length across the tube envelope is equally remote. Special silica glass tubes are required if the bacteria-destroying energy is to be effective; if you purchase such a germicidal tube, extreme caution must be exercised or you may finish up communicating with your precious fish in braille.

The point I am making is that when you have got it right it is a lethal piece of equipment; any attempts to purchase a tube and house it in a jam-jar are worse than useless and highly dangerous not to mention a sheer waste of money. Some devices already on the market for aquarists are unsafe or constructed in a manner which will finally result in the whole idea getting itself a bad name. One marketed for approximately £6.50 has a tube-life of 600 hours or one month (cost £78 per year if replaced) after which the fish may die and bacteria will flourish. Between the tube-envelope and

the water there should be a protector sleeve. The clearance between the tube envelope and a quartz protector should be minimal; it is not safe to have your tube envelope in contact with the aquarium water. Cooling at that point is detrimental to the consistent production of ultra violet energy if not designed correctly. If it breaks (and it probably will owing to uneven expansion) the chances are that all the fish in your tank will be killed. The water that passes over the protector sleeve should be spiralled so that all sides of the bugs become exposed to the radiation unless the distance between the protector tube and the outer ultra violet filter jacket is made sufficiently small to prevent possible escape from exposure. In a device such as an aquarium the sterilizer will be in a reciprocating system and so you may catch it next time round; the turbulator becomes less important.

The outer jacket must be manufactured in either non-toxic opaque material or filter-glass and of adequate strength to carry the inlet and outlet water tubes.

Ultra violet radiation will destroy virus, bacteria, protozoa, fungi or all germs known to man, unlike your chemically treated municipal water supply which is literally crawling with some of them.

Municipal water supplies are treated in a manner to render them harmless for human consumption, the emphasis being on the destruction of bugs (which cause human diseases) mainly by the process of chlorination. If you care to test this out, seal off a small tank of tap-water, raising the temperature to 85°F and supply plenty of light, in three to four weeks I guarantee the conditions in that tank will be as bad as a very stagnant ditch.

Some bugs are more resistant to ultra violet radiation than others and so the exposure time or intensity may need to be adjusted; this can be accomplished by using long ultra violet tubes and controlling the flow-rate over them. Fortunately, however, the most resistant bugs are infrequently water-borne. As a matter of interest some professional manufacturers of proven ultra violet water sterilizers incorporate tubes three feet long. However, by good design tubes no longer than 4 or 5 inches may be used and provide adequate sterilization for domestic sized aquaria. They consume only 4 watts and have one year of life continuously run (replacement cost only £5).

The unit I built with an 18-inch tube can safely hold down 200 gallons of water at a flow-rate of over 50 gallons per hour and consumes only 15 watts; maintenance £4 per year.

After two or three days of treatment with this device it is safer to drink the water from my Discus tank than from the municipal water supply. I have found peat filters unnecessary during the period ultra violet sterilization has been employed; fish eggs are not subject to bacterial attack and uneaten food remains

clean for a very much longer time.

The fish have grown at an alarming rate over each repeated experiment. An attempt on my part to divide a batch of young fish in two parts, half in one side of a divided tank sterilized, the other half in unsterilized water with common heating and lighting, was so convincing after only four weeks that I removed the divider to give them all sterilized water. Like most things in life when all is well, we are inclined to forget that things were ever bad. The sterilizer in a cupboard or at the back of the tank does an unseen job. It requires maintenance and the annual replacement of a tube (if designed correctly) or things will go wrong and you will unjustly blame the sterilizer for what is, in fact, your own negligence. The quartz tube should be removed and cleaned if it appears to have become opaque. However, in distilled or demineralized water this chore is infrequent.

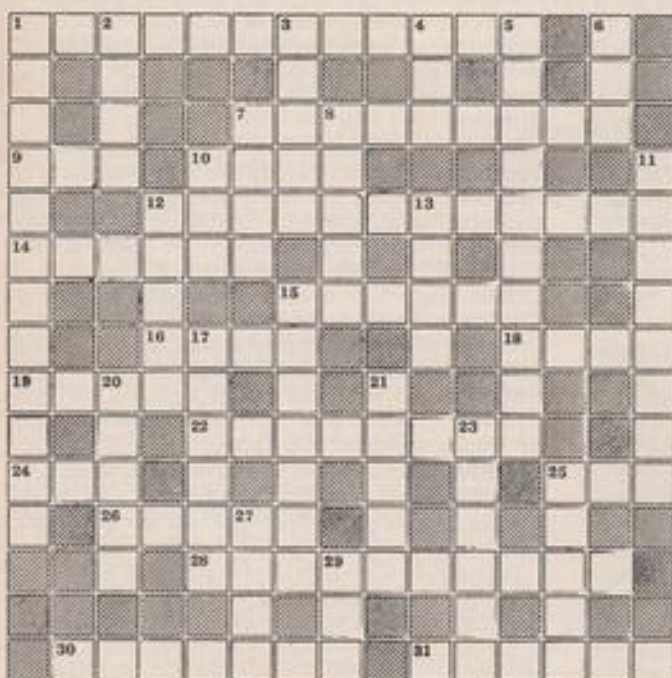
The fish kept in this healthy environment will not

take kindly to removal into unsterilized water where the onslaught of bacteria sickens them almost immediately. If you breed difficult fish like Discus, and you certainly can under sterilized conditions, it is unfair to the fish and the purchaser to sell these young fish without first warning the prospective buyer of the requirement for sterilized water.

I would not like to create an impression that this magic called sterilized water opens the door to complete success. Correct diets and the removal of faeces or uneaten food play an equally important part. Keeping difficult fish alive, encouraging them to spawn and the eggs to hatch is the initial problem, rearing young fish to a size large enough for them to eat adult fish foods is certainly another. There is, however, no doubt in my mind that the keeping and breeding of Discus is on the way to becoming as common as with any other aquarium fish, and is to be achieved by the medium of sterilized soft water.

The AQUARIST Crossword

Compiled by M. W. CLARKE



Solution on page 371

CLUES ACROSS

1. Anabantids beware if this seafish is found around your nest (7, 6).
7. A fish out of water will do so (9).
9. Small 14 across (5).
10. The body of a ship (4).
12. Dracula of the aquarium (7, 5).
14. Travelling animal companion? (6).
15. Spanish madam (6).
16. Large seaweed (4).
18. Canvas home (4).
19. A woman's place in the sheikhdom (5).
22. All 11 downs should be so (6).
24. To possess (3).
25. Disease in a sick fish (3).
26. It's usually gastronomy (4).
28. The 'Ride-him-Cowboy' type of disease (10).
30. Type of stream to find a Rivulus? (7).
31. They make us aware of our surroundings (6).

CLUES DOWN

1. Useful in sexing tetras (6, 4).
2. Dutch slipper? (4).
3. Shellfish (5).
4. It may contain yolk (3).
5. Water would have done so in the case of 7 across (10).
6. Professional charge (3).
7. Passage way (4).
8. A fish's outer coat (5).
10. Colour tone (3).
11. Every aquarist should have one and be proud of it (4, 4).
12. Name of a swordtail (5).
13. *Hypoclinemus gracilis* should do so (4).
15. A gesture from the wizard (5).
17. Remains of *Barbus miosomphax* after the barbecue (6).
20. These baby fish should be killed (5).
21. An angry sound from that bad-tempered Piranha (5).
23. Food always is so (6).
25. Cain's people? (5).
27. Angler's stories are often inclined to be (4).
29. This, with a dash, makes more (3).



British Freshwater Fishes

by A. Boarder

THE BURBOT

THE BURBOT or Eel Pout, is a rather remarkable fish as it appears to be the only member of the cod family which inhabits freshwater. Although it is occasionally found in brackish waters of the upper Baltic, it can be claimed as a freshwater fish. In appearance it is almost like a catfish, with its elongated body and barbels. The dorsal fin is peculiar in form as there is a small rounded version in the usual dorsal position and then a long fin extending right to the caudal fin. The anal fin is also very long and shallow running to the caudal fin. The colour of this fish is a dirty brownish-green with brown mottlings all over the upper half of the body. The burbot can grow to about a yard in length.

The fish is mostly a bottom-feeder sifting through the mud and eating any crustaceans it can find there, also it will take any form of live foods including small fishes. Spawning takes place in winter, from December onwards, sometimes into March. The eggs are about a sixteenth of an inch in diameter and lie on or near the bottom. As the temperature

of the water is likely to be in the region of 40°F., for most of this time, the eggs take a long time to hatch, often five weeks. The eggs have an oil globule rather like the egg of a cod. Providing the fry find sufficient food they can reach a length of about three and a half inches in the first year.

The burbot is found in northern Europe, and in England, south of Durham. It appears to be absent from Scotland and Ireland, and does not seem to be very numerous in any of our British rivers. Although I have been connected with freshwater, mostly coarse, fishing for very many years I have never yet come across a burbot. It would be interesting to learn from any of the readers if they have caught or heard of one being caught fairly recently in this country. From the lack of any mention of this fish being in general angling waters, it may be that this fish is becoming rare or at least not often come across. The nearest saltwater relative is the Ling (*Molva molva* or *M. vulgaris*).

WHAT IS YOUR OPINION?

by B. Whiteside



I WOULD LIKE to begin by following up some of the points which I made in previous columns. I had my trip to London, since last writing, and am pleased to report that the N. Ireland team won the final television round of the inter-regional university quiz. My own television debut was a bit of a disaster, but I enjoyed my visit to Alexandra Palace and meeting Mr. Richard Baker, the B.B.C. newsreader. During my overnight stay in London I managed to visit one dealer's establishment on the Sunday morning. I saw some beautiful discus and brought four young ones home with me on the 'plane. This answers the second half of my question—No. 5—in the November issue. I'll be writing about my first experiences with discus later on. In the December issue I mentioned the excellent photographs and article by my friend, Jim Dunbar. Unfortunately the words "in the October edition of *The Aquarist*" were omitted by the printers, and this made the sentence on page 286 seem peculiar. On page 287 of the same issue I said that I would risk up to 30 cardinals in an 18 in. x 12 in. x 12 in. aquarium. I omitted to say that I was speaking of young cardinals and that I would only risk them in a tank of this size for a short time. Naturally, if the fish were to have sufficient room to grow into adults, between ten and fifteen cardinals would be more than enough to raise in a tank of the size stated. Now to this month's letters.

The first letter comes from Mr. S. A. Black, who lives at 200 Merville Garden Village, Whitehouse, Newtownabbey, Co. Antrim, N. Ireland—a place which is not too far from where I live. Mr. Black begins by saying: "I would firstly like to thank you for such an interesting column which gives hobbyists like myself interesting and proven information, and also gives hobbyists an opportunity to express their considered opinions—which may prove of some value to other aquarists." Mr. Black goes on to state that he finds a lot of conflicting information, in different books, as to the sizes to which certain fishes will grow, and as to the number of fishes which can safely be kept in a tank of a given size. He says that he is sent into "fits of frenzy" whenever he considers his own tanks, wondering if they are over-stocked, or half empty. He listed the sizes of various fishes from different standard books, and found for example that the Opaline Gourami grows to between 3 in. and 6 in., swordtails between 2½ in., scats between 5 in. and 12 in. and red-

tailed black sharks between 4 in. and 7 in., and he says that the list could go on and on. He finds this diversity confusing and thinks that it would be in the interests of both dealers and hobbyists if an accurate size chart could be compiled. Tank space could then be put to its greatest and safest use.

16-year-old Julian Cheese lives at Redbrook Farm, Redbrook Street, Woodchurch, Ashford, Kent, and he thinks that the fish in my photograph in the November issue is a liberty molly—which he names as *Poecilia sphenops*. He identified it from K. Jacobs' book "Livebearing Aquarium Fishes." Julian can grow *Cryptocoryne* plants and *Aponogeton* plants successfully in the same tank. The longest plant which he has grown was a 3 ft. piece of *Elodea*, in a coldwater tank. His favourite thermometer is the small, round type. For a Christmas present he would like to have received either a large breeding tank or a large book on aquarium fishes. Julian asks how readers cure mouth-fungus. He has cured fish by painting the affected area with



Water Wistaria

iodine. He also asks if anyone has grown (Photo 1) water wistaria as an emerse bush, and he would like to

know the cost and size of the largest all-glass tank which any reader has made using silicone sealant.

Mr. G. Reeves writes from 24 Castlemead House, Camberwell Road, Camberwell, London, and he thinks that the fish in the photograph is a liberty molly, as he has a pair of "these lovely fish" in one of his 4 ft. community tanks. He has never seen a *Cabomba* plant as long as the one in my other photograph but he has had a plant of *Egeria densa* grow to over 6 ft. He had to cut his plant back as it was drooping all over his tank.

121 Aughton Street, Ormskirk, Lancashire, is the home of Mr. B. Swift, and he thinks that the fish in the photograph is a cross between a *Limia nigrofasciata* and *Xiphophorus helleri*—because of what looks like a sword on the tail of the fish. He has beautiful specimens of *Cryptocoryne willisii* and *Aponogeton crispus*, both 14 in. tall, growing side by side in a tank with neither aeration nor filtration. His experiences of buying fish are just the opposite to those of Mrs. P. Brown of Torquay. He has found dealers most helpful in selecting the fishes which he wanted—even to the extent of being given a net and told to "help himself". He has also been told which are the most healthy fishes and which are the least healthy. He asks me to print the address to which readers should send their letters. Send them to me at *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex. (Please include a S.A.E. if your letter requires a reply.)

15-year-old Carl Pearson resides at 25 Glencoe Drive, Chadsmoor, Cannock, Staffs, and he finds W.Y.O. his favourite section in the magazine. He has kept *Monodactylus argenteus* for nine months and finds that they do best in shoals kept in brackish water, with plenty of sunlight. His fish eat both live and dried foods. He uses *Tubifex* after it has been cleaned in *Diseasolve* and all his fish like it. His other favourite fish is the cardinal and he finds Dr. Sterba's "Fresh-water Fishes of the World" to be the most informative book.

Mr. P. Thompson's home is at 71A Peel Road, Bootle, Liverpool 20, and he too considers the proverbial fish to be a liberty molly. He says that the ratio of males to females usually seen in dealers' tanks is 10:1, the females being larger than the males. He informs us that the males will try to mate with just about every fish in a given tank. He says that Derek McNerny's book gives information on sexing orange chromides: the females have two white bands on the tail—one running parallel to the top edge and one to the bottom edge. These are absent in the male.

The next letter comes from regular contributor 15-year-old Andrew Patterson, of 4 Springwell Road, North End, Durham, and he thinks that the fuss about the small hole drilled in the shell of my tortoise was pointless. He thinks that no pain is caused if the hole is drilled at the edge of the shell. He drilled such a hole in the shell of his tortoise and it lived for 8½ years

afterwards. Andrew has grown species of *Cryptocoryne* with red coloured leaves with no trouble; he finds that *Cryptos.* thrive better in tanks where *Aponogeton* species are not present. Andrew says that he could write twenty pages about fish shows, as he likes them and does well in them. He thinks that any non-distortive container should be allowed. His favourite type of aquarium thermometer is the outside, stick-on variety. His ideal Christmas present would have been a pair of green discus. Andrew ends by saying that he read with interest my comments on my new Practica Super TL camera as he is seriously thinking of buying one. (I like my new camera very much and note, from photographic magazines, that this particular camera can now be obtained from certain retailers at considerably reduced prices—however, Andrew must be quite a rich young man as the camera is still quite an expensive instrument).



Young Oscar

Mr. E. Bartlett-Love, who lives at 119 Chetwode Road, Tadworth, Surrey, says that he has tried several plants with red coloured leaves but they have not flourished. Several *Cryptos.* grew slowly but lost their red colouring and turned green. He has shown fish and has won prizes but is convinced that fish which are shown are short-lived—due to being transported, with possible temperature fluctuations. He feels that the best fish do not go to shows as they are too precious to risk. Mr. Bartlett-Love only uses outside thermometers because his cichlids "knock hell out of" his inside ones. To obtain discus he suggests robbery or Ernie! For a Christmas present he would have liked to spend an evening with me, Jack Hems, Bob Heath and a bottle or two. (It would have suited me. I must say that I would very much like to meet Mr. J. Hems and Mr. A. Boarder whose articles I have read avidly since I was a young schoolboy. Perhaps I'll have the pleasure of meeting them some day!) This letter writer suggests that I try some cichlid breeding as he finds it easy and great fun. (I made a trip to Belfast recently and bought some new fish. They include the dwarf gourami which appeared in the December issue, and the attractive young Oscar shown in Photograph 2

and several *Apistogramma ramirezi*. Together with the young discus which I bought in London, I now have three species of cichlids—and I must admit that I could easily get "hooked" on these most interesting fishes. I do have a number of large angels, and several *P. kribensis*, in my school aquaria, and these fish are very popular with the pupils, especially the two kinds of angel fish. I was interested to learn that the London establishment had a new type of angel for sale—the turquoise angel—of which I have never before heard. They sound most interesting fish and I look forward to seeing specimens some time in the future. Have any readers yet seen this new colour of angel? If so I'd be interested to hear their views on the fish.) Mr. Bartlett-Love asks if I could possibly publish a list of clubs which are willing to sell copies of their magazines by post. He thinks that many aquarists would be interested to read about what is going on round the country—and suggests that it would also help clubs' funds. (Club secretaries and readers might let me have their views, please). He ends his letter by asking if I could do a "Which"-type report on flaked foods. (It would be rather difficult as many foods do not give analyses or contents on their cartons—and new flake foods seem to come on to the market almost every month. I'll certainly consider it!)

I'd like to break off here to thank all those societies who kindly send me copies of their newsletters. Unfortunately, because of the number of letters which I receive each month for this feature, I am unable to give many of them a mention. I was particularly pleased to receive a copy of the Tasmanian Aquarium Society's newsletter: "Aqua-Life." This publication reached me all the way from Australia and contained, amongst other interesting items, a photograph of a freak two mouthed trout. It was pleasant to read about the aquarium hobby's progress on the other side of the world. I would like to thank Mr. K. Ayres, of 10 Kennedy Street, Newnham 7250, Launceston, Tasmania, Australia, for sending me the newsletter. Mr. Ayres states that he and his aquarist friends look forward to the arrival of their copy of *The Aquarist*, which is passed round, and W.Y.O. is their favourite feature. Mr. Ayres says that he would be pleased to hear from aquarists on this side of the world. (I'm sure that some readers would find it interesting to exchange letters with him). I'd also like to thank Mr. R. C. Mills, who lives at 70 Lee Road, Perivale, Middlesex, for sending me a copy of the F.B.A.S. Bulletin, a most interesting eighteen page magazine which he edits—no mean feat! This publication contains a lot of useful and informative articles and is well worth reading.

14-year-old Master L. Fox, of 5 Britannia Crescent, Lynham, Wilts., writes to say that the fish in the photograph is a "type of liberty molly." His father has a young plant of the red leaved *C. blaussii* and it's producing a new, young shoot at the moment. Master

Fox likes the small, round thermometer best because he finds it easy to read off the temperature.

A reader recently asked for information about the coloured illustrations in "Exotic Aquarium Fishes," by Innes. Dr. J. N. Carrington, of Interpet, sent me an interesting letter. He writes: "I think I am probably the only man in the country to have seen the originals and so can answer your question. They were shown to me by Allan Willinger, one of the directors of Metaframe, when I was at their plant in Maywood, New Jersey, some years ago. They purchased the rights of the Innes book from Dr. Innes. As I recall, the coloured pictures are painted black and white photographs. I am told that the job was done by a very skilled artist, with very close supervision from Dr. Innes. This was, of course, done before coloured photographs were available, and the paintings are of such high quality they must be almost priceless." My thanks to Dr. Carrington for this most interesting piece of information.

Mrs. Eva Parsons writes from 31 Redmoss Road, Nigg, Aberdeen, about her garden ponds. In her front garden she built a circular, raised pond from granite setts found at the beach. The pond is lined with plastic and finished off with a fountain. She stretched a permanent net just beneath the water surface to keep out fishing seagulls and the neighbour's cats. Her fish are thriving and she has kept a moor in the ponds for three years. She asks: "Who says they are not outdoor fish?" In winter, when she removes the fountain, she replaces it with an ordinary aquarium heater and this she switches on when the ice layer gets thick; this provides a breathing hold for the fishes. In her back garden she has a smaller pond made of glass-fibre. This pond gets very dirty but is easily cleaned out. Mrs. Parsons enclosed three very attractive coloured photographs of her ponds. Mrs. Parsons ends her letter by asking if fishes' fins can grow in like toe-nails. Her veiltail angel was affected with in-growing fins, which curled and shrivelled, so she cut off the tips. The fish did not seem to be affected and she now seems to see the fins stretching longer again. She asks for readers' comments on her actions, and on the causes of the fins curling!

Before rounding off this edition I would like to thank the lady who asked about the progress of my hand, which I severely injured on Christmas Eve, 1969, when trying to remove a broken pane of glass from an aquarium. The hand has made good progress and I can use it reasonably well, but the circulation in the affected fingers and thumb has not yet improved very much—a fact of which I am now very aware since the nerve has grown to the finger tips again and I can now feel the cold fairly well. However, I'm still hoping that the nerve will continue to progress for a bit longer, and improve the circulation and my sense of touch. It has been a long, slow recovery. As I have warned so often

in the past two years—take great care when you are working with aquarium glass!

Although I still have about thirty letters left in my postbag I must bring this month's feature to an end. Thank you all for writing. For next month send your opinions on the questions in the text above, and on the following: (a) What is your opinion on combined heaters and thermostats? (I have found that they are

much handier, prevent trailing wires, and give more accurate temperature control than separate units). (b) Do you feed *Tubifex* worms directly to your fish, or first of all treat them with a specific preparation? Details, please. (c) What have been your experiences with golden gouramis? (d) What would you use to sterilize an empty tank which had contained diseased fishes? I look forward to your letters!

Chalceus *macrolepidotus*

by
Jack Hems



THIS IS AN interesting fish of most handsome appearance from north-eastern South America. It is a characin and grows to a length of some nine or ten inches. Up to a few years ago it was popularly known as the pink-tailed chalceus or pink-tailed characin, but not so long ago I saw some specimens swimming in a dealer's tank labelled "Apollo Shark."

Chalceus macrolepidotus has been known to the *cognoscenti* for just over three decades. It was introduced into Europe (Germany, to be precise) in 1938. It is a top-swimmer, a shoaler, and, at full size, if not before, a hustler and swallower of fishes much smaller than itself. The last was my sad experience with a couple of largish specimens some few years ago, but in this Professor Sterba does not agree. He states that *C. macrolepidotus* is not at all a predatory species (*Freshwater Fishes of the World*, 1962).

Perhaps the most outstanding feature of this fish is the large scales. These have a lovely metallic brilliance or sheen. The body itself is long and compressed. The general colour is slaty blue-grey shading down to silvery white on the underparts. Strong light playing on the sides reflects green to blue tints. The fins are small except the caudal which has well-developed lobes. The fork is deep. This fin is pinkish to red

which explains the old and apt popular name. The upper iris of the eye is red; the lower part is green; the pupil is black.

In a spacious aquarium (the first consideration), the fish is seldom still for long. It cruises about with minimum effort and perfect grace. Clear water, properly matured and not hard, a plethora of plants in the background, and a temperature in the neighbourhood of 75°F (24°C) are the next essentials. Of great importance is a close-fitting glass cover, for the fish can shoot forward and upward with the speed of a loosed arrow. In a word, it is an accomplished and rapid jumper. It is not faddy about food, but flourishes well on a diet of meat, worms, flies and baby fish.

If there are any external differences which can be said to denote sex they have escaped the notice of observant aquarists in this country and abroad. Further, there appear to be no records of its having spawned in captivity.

It is a magnificent fish to see swimming around in a large decorative tank. Fishes such as the silver shark (*Balantiocheilus melanopterus*) and the long-finned African tetra (*Alestes longipinnis*) make suitable companions.

Cichlasoma severum

by T. J. Green

THE STately *severum* is a firm favourite of cichlid lovers and is my personal first choice whenever I am asked which fish I prefer. Some years ago when I purchased my first *severums*, an adult pair of about six inch length, they looked so beautiful when placed in a newly set up tank that I had built into the breast wall of my living room that my whole family sat in a semi-circle around the tank and just gazed for ages.

Unfortunately, the female died after only a month and although I showed the male at local shows for a couple of years with a fair amount of success I was never able to buy another female of equal size to make a pair.

As adult fish are not only very expensive but also quite hard to find, I decided to get hold of some good young fish and to set about bringing them to maturity. I bought eight attractive young fish and for the past three years I've looked after them with special attention, until at last I can try and spawn them.

I lost two and sold two which didn't seem as good as the others; now I have four fish of approximately five inches in length.

Few other fish are capable of the tremendous colour variations that take place with the *severum*; in response to different conditions and stimuli you can see stripes appear and disappear; spots come and go; it's often difficult to recognise which fish is which as a result of these changes. Sex characteristics are easily distinguishable. I don't think that elongations of dorsal and anal fins can be relied upon as a method of picking out males. Perhaps with age this is a helpful guide but with fish up to four inch some females have longer finnage than the males.

The most obvious difference I have noted is that the male has rows of reddish-brown spots along the length of the body, and a mosaic pattern of the same hue on the gill-plates and the area around the eyes. Females have a lighter edition of this coloration outlining the scales on their sides. The throat of the female is very dark, almost black. This is greatly intensified when in breeding condition and when this occurs the underside of the fish, which is normally a palish green, turns a deep and brilliant yellow. *Severum* have five dark bars passing vertically through the body and another wider one which reaches from the base of the dorsal through to the base of the anal fin; these bars darken or fade with the mood of the fish.

One interesting thing about these bars: I have

found that fear is one of the prime causes of the appearance of these bars. Possibly this is part of the native protective coloration, but if the dark bars remain evident for any length of time, then all is not well with the fish. I have noted that when about to die, or when sickening for some ailment or disease, these markings are very much in evidence.

The courtship of *severums* is quite fascinating to watch. The colours of both fish are brilliant. The yellow on the underside of the female really glows. In turn they swim around each other with a peculiar quivering action which culminates with what can only be described as giving each other a slap across the face with the tail.

This behaviour is a prelude to the next stage of the ritual, the jawlocking. This traditional cichlid trial of strength is a very serious business and when it is taking place they appear to be oblivious of any on-lookers. It's pretty certain that the fish use this procedure as a means of testing the strength and vigour of their partners. Should either be unwilling to take part in the tussle the chances of spawning are slight. It is more than likely that the one who breaks off will be hounded and possibly killed by the other. Considerable pressure is exerted during jaw-locking and the mouths of both fish can get damaged. I have seen fish with a lip partially or completely missing and the conclusion I reached is that these damaged fish were the losers at some earlier session of jaw-locking. It is during this pre-spawning period that it is possible to see the differences in the breeding tubes; the female's tube is longer and much thicker than that of the male.

The pair were in a three foot tank with two inches of gravel but no plants. A few flat stones were included to enable them to have a choice. The temperature was just over 80°F. During interludes between jaw-locking and sparring a suitable stone is selected and eventually the spawning begins.

The female moves slowly over the stone with the male in close attendance. The eggs can be seen quite plainly as they emerge from the tube. As she moves on the male fertilizes the eggs that have been deposited. This takes over an hour. On completion I removed both parents.

To stop sediment from settling on the eggs I positioned the outlet of the Dynaflo filter in such a way that the flow of water was aimed directly onto the

eggs. I also added a small quantity of methylene blue.

After 24 hours there were six eggs fungused, the remainder, about 300 seemed OK. After 48 hours approximately sixty more eggs had turned white. These were picked off and siphoned out to lessen the chance of contamination.

Hatching began after 72 hours. During the last 24 hours the fungus rate had increased but there was still plenty of eggs left. When hatching was over, there appeared to be something like 200 fry on the bottom of the tank.

A further four days passed before the fry were free-swimming. I began feeding with Liquifry. The fry were very active and I could see them taking the small particles of food. After a week I began to feed brine-shrimp, young *daphnia* and micro-worm. Still too many fish to count but there appeared to be at least 200. They all looked good and were swimming in three shoals, seeming to prefer the darker areas of the tank.

When the fry were three weeks old I was just about to congratulate myself, thinking that the worst part was over, when suddenly I noticed a great reduction in numbers. I don't know what went wrong. It's possible that although I've fed them fairly well, I was

so careful not to pollute the water that I may have starved them. Eventually there was only a dozen left. I never saw a dead fish; they just disappeared.

The remaining 12 fish are now 12 months old and are $\frac{1}{2}$ in. long. Considering that severums grow to quite a large size, the rate of growth is very slow.

Since that time I've spawned both pairs of fish twice. I've tried various methods of hatching, even putting the eggs in distilled water. Each time the majority of eggs fungused and I only saved two or three from each spawning.

I would be pleased to have correspondence with anyone who can offer any advice or suggestions on where I am going wrong. The *Tilapia mariae* which I wrote about in the September issue seemed to hatch without any special attention, as do the convicts that I have. It seems that severum are rather more of a problem.

I consider the advice given by most of the experts in the acknowledged handbooks is very sound. That is, whatever you do when trying to spawn fish always keep a written record of your actions; whether you have success or failure if it's all on record at least you can refer to your notes and endeavour to improve on failures or reproduce your successes.

My address is 185 Station Road, Kingswood, Bristol.

BOOK REVIEWS

Photography for Aquarists by Dr. H. R. Axelrod, published by T.F.H. Publications, price 75p.

Having tried my hand at aquarium photography on and off for about six years, I was interested to see the first book entirely devoted to this subject. Dr. Axelrod's work as a photographer of aquarium fishes is well known, and in this book he makes known some of his "secret" techniques.

I found the book to be quite interesting although it did not tell me much that was new about the subject; however, for the aquarist who has not tried photographing his fishes or aquaria before, it supplies useful information. The book contains 46 high quality coloured photographs by a variety of photographers, 10 black and white photographs, and 8 helpful diagrams. Quite a few of the photographs have been seen before in other publications.

There are 64 pages in this soft cover book, and the 13 chapters cover topics such as types of cameras which are most suitable for aquarium photography, film types, lighting, conditions under which fishes can most suitably be photographed, etc. Techniques for photographing living and dead fishes are given, and the author describes the use of an anaesthetic to immobilize fish which are to be photographed. His description of squeezing a fish between two sheets of

glass, to get a good photograph, with the occasional death of the fish caused by resulting internal bleeding, would not encourage me to use this technique!

All in all I would recommend this book to the aquarist who has a camera and who would like to learn more about how to photograph his fishes.

B.W.

All About Discus is another T.F.H. Publication book, written by Dr. H. R. Axelrod, with supplements by Dr. L. P. Schultz, Mr. G. Keller, Dr. G. Schubert, Dr. R. J. Goldstein, Mr. J. Wattley and Dr. R. W. Burke. It has a soft cover, contains 127 pages, and costs £1.25.

This is one of several books which deal exclusively with the most élite of aquarium fishes. The book is well illustrated with a variety of coloured and black and white photographs by several photographers. There are six chapters which deal with the discus as an aquarium fish, feeding, housing, diseases, breeding and classification, etc., and a seventh section which is taken up by a discussion of views held by the seven contributors.

The book contains a wealth of information about discus, but as there is often disagreement between contributors, one has occasionally to make up one's mind; however, if one is interested in discus, this would appear to be the best available book on the subject to date.

B.W.

Enjoy Your Discus, edited by Earl Schneider, and published by The Pet Library Ltd., price 15p.

One can buy very little in the way of a book for 15p, but this little 32-page book, with soft covers, is very good value for the discus fancier. It contains 13 coloured photographs—some of which give slightly inaccurate colour tones, and seven useful black and white photographs. The book contains five chapters which deal with such subjects as feeding, keeping, breeding and colour varieties, etc.

In such a short book one cannot expect the subject matter to be covered in great depth, but this little book does give a very useful general picture of the care of these fish, and at 15p it is well worth buying.

B.W.

Enjoy Your Gouramis and Other Anabantids, by Gene Wolfsheimer, published by The Pet Library Ltd., price 15p.

Another 32-page book, with soft covers, from The Pet Library Ltd., this one gives a useful introduction to the Anabantids. The 10 chapters cover subjects such as sexing, feeding, maintenance, breeding and diseases, etc.

It contains 17 reasonably good coloured photographs, five black and white photographs, and a chart giving details of a wide range of common and less common Anabantids.

Again, at 15p, I consider it to be good value, and a useful book for the beginner with these fishes.

B.W.

HELP . . . For the Worker

by F. Morley

MEMBERS OF Aquarist Societies, like the fish, come in two categories. The fish are egg-layers or live-bearers; the members are workers or non-workers.

Non-workers can be found in any organisation, and to quote a famous comedian 'You've met 'em'. They sit at the back, do nothing to help, but they can always tell you what YOU should have done.

Much as the workers would like to drown them in the club's murkiest tank and bury them below that enormous *cryptocoryne* they are always bragging about, restraint is advised. The best way to help the workers is to enlarge the membership and hope that some of the new members will be of the working breed.

This is, of course, obvious, but so few clubs do more than talk about it; great ones for talking, aquarists! But how to get new members?

Even the best-natured secretary has a breaking point, so don't push anything else on to him. Why not appoint a publicity officer? All the best firms have them.

To advertise in the local press could be expensive, especially for the small club, though the extra membership fees could easily cover the cost. Have you tried all the free publicity available, public library, and school notice-boards for instance? Some councils publish booklets listing organisations and giving the name and address of the secretaries. Is your club included in the local one?

Most aquarist dealers would be willing to display a notice in the shop giving details of shows, meetings, etc. Do remember to add the name and address of

at least one of the club officials so that the prospective members can contact him or her, then they won't feel quite such a stranger at the first meeting they attend.

Some societies are very modest violets. How did you learn about yours? I know there are four thriving clubs in my area, yet there seems to be no way for the man in the street to know they exist. Only one of them had the secretary's name and address in my magazine though I searched through several issues.

To raise funds for publicity it should be easy enough to organise a few coffee or wine and cheese evenings. As I said, aquarists are great ones for chatting and get-togethers. Why not a sale of breeders' surplus and a brains-trust too?

Then there is the thorny question of young members, and it can be a thorny one if, as so often, the club meets in a pub. Incidentally, do the pubs always have to be the gloomy old ones at the scruffy end of the town? I have heard it said that the tea-drinkers can grow fish as big as those grown by beer-drinkers.

A juvenile section can be a great asset to a club. As a rule youngsters are keen and hard-working, and a sight more willing to help at shows than some adults.

Maybe starting a youth section is the answer to the problem. Maybe not, but they could provide the workers to keep the club going when the present ones have collapsed from overwork.

Ornamental Plants

by A. Boarder

IN A PREVIOUS article I described some useful under-water oxygenating plants for the pond and will now deal with plants which are ornamental and grow mainly above the water. I feel that few people will disagree with me when I state that the water lily is a must for any garden pond. If the pond is not large enough for at least one water lily then it cannot be classed as a pond but is just a puddle. A water lily gives that extra attractiveness to any pond which brings the eye to such water and I know of no water plant which has such magnificent blooms.

Although I consider that no pond is complete without a lily, I also know that these plants can be wrongly used. If too many plants are used or they are allowed to get out of hand then the main beauty of the pond will be lost. Once the leaves of the lily occupy two thirds of the surface of the water then the fishes may rarely be seen and much of the attraction of such plants will be lost. Should the plants get extra large then their leaves will not be able to lie flat on the surface but will grow up into the air and lose their usefulness. One of the main uses of the lily leaves is to supply some shade for the fishes during sunny weather. If the leaves are up in the air then they not only look untidy but they do not supply such a good resting place for goldfish.

The planting of the lilies can have a direct result on the way they function afterwards. One of the best uses of the lily is that the roots can take in much of the waste matter in the pond such as the droppings of the fishes. This will assist in keeping the water pure. Some authorities recommend that some form of manure should be incorporated with the planting compost to give nourishment to the plant. If this is done then one of the most important uses of the plant will be lost, as if too well fed the lily will not need to search for waste matter which could settle in the pond. Plastic baskets are ideal for such planting and just a piece of turf will usually be sufficient for starting the plant into growth. After the first few weeks the lily will send out roots outside the container and grow into the surrounding mulm. If one is mistaken enough to use a quantity of soil in the



Primula florindae

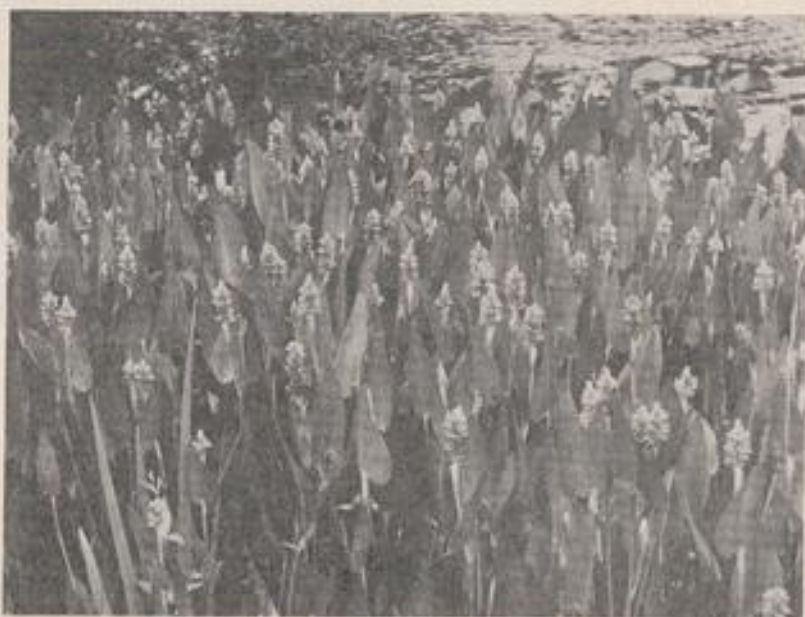
bottom of the pond, then the lily, or any other plant could run its roots all over such matter and be almost impossible to keep under control in future.

The choice of water lilies is quite large but one must make sure that the correct type only is used. There are plants which could grow in a foot depth of water whilst others will thrive in two and a half feet. The type for the fairly shallow pond are known as *Nymphaea pygmaea*. A small yellow flowered variety is *N. pygmaea helvola*, and a good white *N. pygmaea alba*. For a medium sized pond with a depth of about 18 inches there are many from which to choose and a look through a catalogue will provide a wide choice. Varieties which were introduced by Marliac are particularly useful and attractive and the well-known *N. escarboucle* is a good example of such types. One of the finest of the group for a large pond is *N. colosseae*, which has flesh-coloured flowers and is a splendid grower. I do not intend to make a list of all the water lilies available as this could only tend to confuse one, but there are so many varieties in most lists that I am sure that the beginner will be well advised to leave the choice to the dealer, having first informed him of the depth and size of the pond and the colours one wishes to have with regard to the flowers.

One point I feel is important and that is, that the plants will react to a certain extent to the conditions they are given. For instance, if a type is intended for a shallow pond but is given too much space and nourishment then it will grow larger than normal and also any plant which should have plenty of space cannot grow to its normal size if restricted either in its space or nourishment.

Having described the methods for water lily culture I must emphasise that there are very many other plants which can help to decorate the garden pond. Many of these are really bog plants and need not be planted very deeply in the pond. If a shelf is not available to lessen the depth of the water, then this

of a pond or in very shallow water. Another good plant of use for the edges of a pond is the Arrow head, *Sagittaria alba flora pleno*. This plant has the typical arrow-shaped leaves and the flowers are very attractive, appearing like miniature white carnations on a long stem. There are forms of reed which are most useful near the edge of a pond and some with variegated leaves have a special appeal. Even some of the native reeds can make a fine show in suitable ponds. One which is very good is *Butomus umbellatus*. This plant has handsome leaves which colour up well in the autumn and the flowers are umbels of rose-pink florescences which are most attractive. It can be easily divided for propagation and only requires a very



Pontederia cordata

can be arranged with bricks or suitable material for raising the base of the plant nearer the surface. Once again I must state that most of these plants will soon get out of hand if they have unrestricted root run. A container is a must if one does not wish to get the whole base of the pond a mass of roots. When considering which plants to buy it is well to consider what their flowers are likely to be. One of the most attractive plants for the fair sized pond is the Pickerel weed, *Pontederia cordata*, which has handsome foliage held well above the water and has spikes of blue flowers which can be on show for most of the summer months. This plant does not have to be planted deeply and could grow in the mud at the side

shallow water. There are so many reeds and rushes from which one could choose, that it is unnecessary for me to make a list of these, but when choosing from a catalogue try to see that those chosen will have flowers which can add to their usefulness.

There are a few floating subjects but I have never found them to be very worthwhile in the garden pond. Usually the water lilies will take up so much of the surface that extra cover from these floating aquatics is not needed. One such plant is the Water soldier, *Stratiotes aloides*. This has leaves in the shape of a rosette and has a white flower. After flowering the plant sinks to the bottom and so is not really a very good type of plant for the garden pond. A



Iris kaempferi

floating plant which has its uses is the Duckweed *Lemma*; this can be used to check the growth of green algae in a pond but it can soon get out of hand if not watched. A good covering will almost certainly cause a green, cloudy water to clear but when it grows too rampantly it can cover the whole of the surface of the pond. When this happens the use of a strong jet of water from a hose can roll the plants to one side when they can be removed with a rake quite easily.

If one is fortunately placed with a large pond then a bog-garden can be incorporated at one side of the pond. This can provide the means of growing hosts of flowering plants which delight in moist conditions. Where a bog-garden is required there must be proper provision made when the pond is constructed. If the pond is connected directly with the bog, there will be nothing to prevent the loss of water by it soaking away. The correct method when constructing is to make the bog garden an integral part of the pond proper but very shallow. A ridge between the pond and the bog garden can be made so that fishes do not get into it but yet there is just sufficient space for the water to percolate into such a garden.

A very attractive plant for the bog is the Musk, or

Monkey Plant, *Mimulus*. The usual colour of the flower is yellow but there have been some great advancements in recent years in the culture of this plant that one can now get plants with much larger flowers which have chocolate, brown or red markings. These plants are no trouble at all to maintain in good conditions, providing they are not allowed to dry out during the summer months.

Some of the Primulas are very handsome and one can choose from several types from single-headed flowers like a tight ball to those with rings of attractive flowers produced at intervals up the stout stems. A good plant of the former type is *Primula denticulata*, which can now be had in other colours from the original blue, such as white, red and purple. *Primula japonica*, produces its flowers in tiers and can be found in white, pink and crimson. It is not difficult to grow and will often multiply in the bog garden from seeds shed the previous season.

One must not forget the Irises which make a good clump of leaves in a short space of time and can bear many flowers to add to the beauty of the pondside. The type known as *I. kaempferi* are very good for the pondside and can be kept within a reasonable size without much trouble. The oft neglected Forget-me-not, *Myosotis*, can be a very easily grown plant which will soon make a delightful mass at the near edge of a pond. Some of the newer strains have large flowers and should always be found a place in any bog garden. There are so many plants for such a position that one can find listed in catalogues, that it is unnecessary to name them all here. If a bog garden can be included then it is well worthwhile.

Crossword Solution

C	U	C	K	O	O	W	R	A	S	S	E	F					
H	L			H		A	V	E									
A	O			D	E	S	I	C	C	A	T	E					
R	U	G		H	U	L	L			P		S					
A				S	U	C	K	I	N	G	L	O	A	C	H		
C	A	R	P	E	T		M		L	R			O				
I				I			S	E	N	O	R	A			W		
N				K	E	L	P			W		T	E	N	T		
H	A	R	E	M			E		S						A		
O				U			B	A	L	A	N	C	E	D		N	
O	W	N		E			L	A	N	D		I	C	K			
K				T	A	R	T			R		I	N				
				S			S	A	D	D	L	E	B	A	C	K	
							L	O			L	E	A				
				R	I	V	U	L	E	T		S	E	N	S	E	S

BIOLOGICAL FILTRATION

by A. Jenno

THERE are three basic methods of filtration available to aquarists for use in small aquaria, i.e., those of less than 200 gallons capacity. These are commonly known as mechanical, chemical and biological filters.

Mechanical filtration methods use various types of containers filled with gravel, nylon wool, etc. to trap large particles present in the water, and chemical filters usually use some type of activated charcoal to absorb unwanted chemical substances.

Both of these systems are useful within certain limits. For instance, in a mature, well-planted aquarium where the plant growth is lush and the fishes are small and not present in large quantities, filtration can be classed as a refinement, and the above types are useful although often unnecessary additions. In cases where plants are not present, however, such as where large Cichlids are kept, or in marine aquaria, or in tanks for raising large numbers of young, then these types of filtration should only be considered as secondary methods. The primary method should always be a biological system and in small aquaria the most convenient form is the sub-gravel filter.

There has long been much controversy among aquarists over this method, mainly through a general lack of understanding of the basic principles involved. As will be seen from the following text, a large mechanical or chemical filter can, in certain circumstances, take on a biological action, usually when neglected, but this action is small and secondary to its main function. On the other hand, a well constructed biological system is a good mechanical filter anyway, and these similarities inevitably lend themselves to misleading comparisons.

Principles of operation:

The main principle of a biological sub-gravel filter is the circulation of the aquarium water through a gravel bed which is the containing medium for a rich culture of certain types of bacteria whose function is to continuously convert toxic accumulations into usable or harmless materials.

There are four definitions which need to be understood:

Aerobic: this describes an environment which is rich in oxygen.

Anaerobic: here the environment is poor in oxygen content.

Heterotrophic: a range of bacteria which feed on organic compounds only.

Autotrophic: bacteria which feed on both organic and inorganic substances and also use carbon dioxide.

Anaerobic bacteria are usually responsible for the foul, putrid conditions found in the gravel of badly kept or overfed aquaria. This situation is obviously to be avoided, so the first essential is to develop an aerobic environment in the filter bed. For this reason the whole of the bottom surface of the aquarium should be covered by the filter bed otherwise anaerobic colonies may become established in the remainder.

The processes of bacterial action takes place in a biological filter in three stages as follows:

(1) Mineralisation

Heterotrophic bacteria are present in any system where there are organic waste products available for their use. These wastes are converted to minerals such as ammonia.

(2) Nitrification

This process is carried out by autotrophic bacteria which convert minerals into nitrates and nitrites

and use inorganic substances and carbon dioxide for the conversion process.

(3) De-nitrification

Both heterotrophic and autotrophic bacteria will carry out this process, given the available materials, and convert the nitrates and nitrites to nitrous oxide and free nitrogen.

It should be understood that the above processes are fundamental parts of the nitrogen cycle, and in a closed system such as an aquarium the well-being of the inhabitants depends upon these functions being carried out at the correct rates.

It appears that mineralisation is pretty well automatic as long as organic wastes exist, and that heterotrophic bacteria will evolve in sufficient quantities, without any other encouragement, to fulfil this purpose. The main offshoot of this first stage is the production of ammonia. If the filtration cycle is left uncompleted at this stage, i.e., sufficient autotrophic bacteria are not present to carry the process further, then the ammonia content will build up to toxic levels with the obvious result. It follows, then, that the development of autotrophic bacteria must be encouraged.

This requirement is the main function of the gravel filter bed. As already stated, autotrophic bacteria require inorganic substances to use in the conversion processes and the gravel grains are an ideal way of providing this. Without the provision of such inorganic material the aquarium cannot evolve enough autotrophic bacteria to continue the nitrogen cycle to any useful extent.

The third stage, de-nitrification, is automatic provided the second stage is satisfactorily achieved.

The quantity of autotrophic bacteria in the bed, and hence the efficiency of the filter, depend upon various factors:

The great majority of the autotrophic bacteria occur in the top 5cm of the filter bed and this should be the minimum depth of the bed. Any increase in depth in small aquaria will not significantly increase the size of the bacteria colony, and thus it follows that the greatest possible surface area is required, i.e., the whole base area.

The gravel used should be of irregular shape as the grains have a larger surface area than round pieces, and for the same reason the grains should be as small as possible, consistent with good water circulation through the bed. A recommended grain size is between two and five millimetres.

An even water circulation is important so as to avoid the development of areas of anaerobic bacteria where there is no oxygen. For this reason the gravel layer should be of equal depth over the whole area and parallel with the tank base. The rate of water flow through the bed and its subsequent return to the surface should be such that the dissolved oxygen content of the water is kept just below saturation

point. This last requirement is somewhat academic due to difficulties of measurement without proper apparatus, but a figure of half a gallon per square foot of filter bed per minute is recommended as a starting point for small aquaria. This can be measured at the filter outlet after calculating the flow-rate required for the particular area in use.

The filter-plate should be sealed to the aquarium walls around the edges with silicone rubber sealant to avoid the formation of vertical channels where resistance to the water flow is less, otherwise the gravel bed will be by-passed by some of the flow.

Constructional details:

The most generally recognised means of moving water around the system is by means of the air-lift principle. This handy idea works as follows:

When the air-lift pipe is fitted inside the aquarium the water inside the pipe automatically levels with that outside the pipe. On the introduction of air at the base of the pipe, bubbles form, and an air-water mixture is produced which is less dense than water alone, and this rises in the air-lift pipe to spill out at the top. Water flows into the base of the pipe to replace that lost at the top, and as long as air is injected the process is continuous. The efficiency of the air-lift is best when it is at least 70 per cent submerged, and is also improved by diffusion of the air supply. It is possible to provide too much air, in which case the air will rush out of the tube without mixing properly with the water. This situation is shown by an unsteady and noisy flow from the outlet tube, and it will be found that a larger diameter air-lift tube will handle greater flow-rates satisfactorily.

The filter-plate should be made of an inert material and have as many holes or slots as can be provided without weakening the structure. It should be remembered that the whole weight of the bed is supported by the filter plate. The holes or slots must be of such a size that the gravel cannot work through them to clog up the circulation system. If corrugated material is used the apertures should be in the lower sections.

Commissioning

There are various methods of encouraging the establishment of a successful colony of autotrophic bacteria in the filter bed. The obvious method is to "seed" the new bed with surface material from an old successful bed. Another method is to temporarily install in the aquarium some hardy animals which are relatively insensitive to ammonia concentrations. Turtles are good for this, freshwater or marine, as required. These produce large quantities of organic wastes and the consequent availability of

Continued on page 375

HERPETOLOGICAL NOTES

by Stephanie Peaker, B.Sc.

Geckos

MORE than four hundred species of gecko *Gekkonidae* are known to occur in tropical and sub-tropical parts of the world. Many types are popular with herpetologists because they are active and live very well in the vivarium. Most of the species kept are from four to six inches in length but the largest gecko, the Tokay *Gekko gekko* from Asia is usually available from dealers. On the other hand, the smallest geckos which belong to the genus *Sphaerodactylus* from the West Indies, are only just over an inch in length.

The typical gecko is a small lizard that runs around houses in the tropics catching flies and moths in the evening. Their feet have the remarkable ability to carry the body almost anywhere but there are geckos which do not fit this typical description and some need different conditions in the vivarium. In this article I shall therefore confine myself to the typical geckos, for example, Brook's Gecko *Hemidactylus brooki*, the Moorish Gecko *Tarentola mauritanica* and the many house geckos offered for sale.

A fairly large vivarium displays geckos to their best advantage. I use a thick layer of fine sand for the floor-covering and on top of this sprinkle dry woodland litter—leaves, sticks, moss, etc. For the back of the cage several pieces of a large tree stump I have found to be ideal. The bark should be left intact and the set-up is safer if these heavy pieces of wood are nailed into place. A small wall could also be provided for house geckos. I never give geckos twiggy branches because they really prefer thick branches arranged around the cage. Pieces of bark are ideal to give shelter to these lizards.

An important point to bear in mind when housing geckos is to make the vivarium really escape-proof. Two doors in such a vivarium are ideal—one large for cage furnishings, water bowl, etc. which is only rarely opened and a small one towards the bottom for routine feeding. It is possible to include a living plant in most vivaria for geckos but in this case plenty of ventilation should be provided to keep the humidity down.

Geckos need heat all the year round. I prefer to have the room heated to around 60°F and then provide individual heat to the cages. A natural dark and light cycle should also be provided and so that the light of the day coincides with the highest temperatures, an incandescent lamp is perhaps the best form of heating and a day temperature of 75-80°F is ideal.

Most geckos are most active about dusk. By having the artificial sunset at a regular time each day the time

of greatest activity can be controlled. A useful addition to the cage is a blue lamp which enables the antics of the lizards to be seen after the main light goes out. Geckos will drink from a dish but I and others have found that, like chameleons, they prefer to drink from droplets on branches, foliage, etc. For this reason I spray the cage fittings every day or so. Care should be taken, however, not to make the cage too damp.

These lizards are best kept in colonies of one species. Many, if given the correct treatment, will mate and lay eggs and the behaviour of such a colony is of far greater interest than of one or two kept with other species. A little trouble may be caused by aggressive males but with plenty of hiding places, or even a cage semi-divided by a wall, it is usually not necessary to remove the offender. Two colonies of geckos we had amply repaid the initial purchase of a dozen specimens of each.

Another problem is how to move geckos from cage to cage without either losing them or their tails in the process. I have not yet found a way.

Geckos eat the usual lizard diet of insects, spiders, mealworms, moths, etc. and as wide a variety as possible should be given, especially during the summer when hedgerow sweepings are of the greatest value.

Most geckos are classified according to the arrangement of their toes, hence the ending *daetylus* on many of the generic names. Many species of gecko can be housed in the manner I have described including such species as I shall describe in a future article on small geckos suitable for the vivarium. A number of less common species are often available from dealers and there is plenty of scope for the adventurous herpetologist.

Algyroides

There is little chance of obtaining any of the three species of keeled lizard (genus *Algyroides*) which occur in Europe from dealers. There is, however, a good chance that those who travel to northern Yugoslavia may be able to obtain some, as we did, from the Istrian Peninsula. This species is *Algyroides nigropunctatus* which is found on large boulders in rather open country. It is very shy in the wild and almost impossible to catch without a fishing-line noose on the end of a long pole. This lizard has a distinctive appearance being very dark brown or almost black above and the scales are keeled. The females and young are olive-white below but the males are bright

brick-red with a blue throat. About the same size as a wall-lizard it requires similar conditions and thrives in the outdoor reptiliary.

In the early 1960's I saw *A. fitzingeri* advertised by a Continental dealer. This keeled lizard is found in Corsica and Sardinia and has a dark olive-brown back. I have never seen a live specimen but the snout is said to be blue and the legs and underparts deep yellow. A third species, *A. moreoticus*, is found in Morea in southern Greece and the Ionian islands. The genus is closely related to *Lacerta*.

Control of Snake Mite

A useful paper taking into account a modern method of insect pest control has recently been published in International Zoo Yearbook, volume 11, 1971. E. Wagner of the Woodland Park Zoological Gardens, Seattle, U.S.A. has successfully used pieces of Shell's Vapona strip to eradicate snake mite. Three to four days' exposure appeared to completely eradicate the pests but some snakes were exposed to the vapour for three weeks. During this time snakes of many different species were given food and water in the normal way and none was observed to have suffered any ill effect.

BIOLOGICAL FILTRATION (cont. from page 373) minerals from the heterotrophic bacteria encourages the fast development of the autotrophic bacteria colony and a subsequent reduction in the numbers of the heterotrophic bacteria to a balanced condition.

If neither of these methods is available, or if it is desirable to set up the aquarium initially with ammonia-sensitive creatures, i.e., most tropical freshwater and marine fishes and invertebrates, then the aquarium should not be fully stocked immediately, but only on a gradual basis so that there is never an excess of ammonia present during the time before a reliable autotrophic bacteria colony is established. Under these conditions, using new gravel, this can be about three months.

Maintenance

Once set up, the filter bed should be considered permanent. It will become gradually filled with detritus which filters down, but this will only increase its efficiency by providing more surface areas and inorganic material for colonisation by the bacteria. A working filter bed should never be washed as this dislodges and removes most of the bacteria. Any layers of detritus on the surface of the bed should be siphoned off, but otherwise no maintenance should be necessary if the system is properly set up. Should washing be undertaken at any time, then aged fresh or salt water should be used, as appropriate, as this will dislodge less bacteria.

Changes in the characteristics of the water will temporarily upset the working of the bed while the

Mindful of the warnings given in several publications concerning the use of this pesticide near fishes and birds, Mr. Wagner carried out experiments on Garter Snakes (*Thamnophis sirtalis*). He kept twelve in each of two identical vivaria but over one placed a fresh full-sized Vapona strip. Thirty days later blood was taken from all the snakes and analyzed for cholinesterase (the enzyme the organo-phosphorus compound in Vapona inhibits). There was no difference between the cholinesterase levels in the two groups, indicating that no damage had been suffered by the snakes over this period.

Mr. Wagner has found that a 1/2-inch strip cut from the standard Vapona across the width per 10 cubic feet of cage is suitable and that four days exposure is sufficient. He suggests that the strip should either be placed on the ventilator or enclosed in a wire cage.

It is very welcome that a really effective method of ridding snakes of snake mite (*Ophionyssus*) has become available and has been tested in this manner. This mite has long been a pest in many collections, seriously affecting the health of many snakes. Incidentally, Mr. Wagner has also used this method to kill mites on lizards.

bacteria adapt to the new conditions. A difference in the number of fishes kept, or their feeding programme, changes of pH, temperature, and salinity in marine aquaria, will all do this. This last point is important in marine aquatics as salinity is generally increasing constantly due to losses by evaporation. Make-up water should always be aged and supplied before the density change is greater than 0.002. Changes such as those mentioned above generally cause inefficiencies in the bed for about three days afterwards, depending on their severity.

It can be seen from the above text that the whole purpose of this exercise is the establishment of the colony of autotrophic bacteria in the filter-bed, and the consequent conversion of ammonia to nitrates and nitrites. It follows, then, that a measure of the nitrite content of the water will give information as to the efficiency of the system. Kits are available for this purpose and their use is recommended, particularly with marine aquaria.

It was previously stated that mechanical and chemical filters should be considered as secondary systems when an efficient biological system is used. In fact it can be seen that the filter-bed is a good mechanical filter and unless conditions in the aquarium are likely to be very bad, possibly due to the particular kind of animal kept or the method of feeding, then a separate mechanical filter should not be needed. If an activated charcoal filter is required this can be fitted as an outside unit and will not affect the functioning of the filter-bed.

MORE ABOUT HAPPY VICS

by Bob Heath

ONE READER DID show sufficient interest in my November article on Lake Victoria *Haplochromis* to spur me on. (Thanks Bill.)

Supposing you plan to put a tank on display in the living-room, for all to watch and admire, it is well to avoid having a male and female of the same species in that tank. Conversely, if you wish to breed the genus it's as well not to put anything *other* than a male and female of the same species in your aquarium. In either event you'll be well advised to have a three foot tank or longer. On second thoughts, I'll rephrase that to: Please don't keep the Lake Victoria *Haplochromis* in tanks smaller than three feet. I've found it necessary, from time to time, to put them in two foot and even eighteen-inch tanks. They always turn off their attractive colours when housed in these small quarters. Not only that, but they fail to behave in the ways that make them interesting. Perhaps generations of aquarium breeding will condition fishes to the home aquariums.

My experience has been with adult fishes from the wild and I fully expect contradiction soon.

So far, I've been delighted with selections of fishes consisting of males and females each from a different species. What could I call that? A cuddle of community cichlids! Perhaps not. A heap of Happy Vics? Compatible community collection? Any suggestions?

This community of Happy Vics, look well in a tank which is heavily planted with *cryptocoryne*, *vallisneria*, swords, *apogoneton* and substantial stuff like this. It's a mistake to put *cabomba*, *ceratophyllum*, *ambulia* and similar fragile "bottle-brush" plants into the tank. The fish think these items are great, mind you. Just what cichlids like best; for tearing into unsightly pieces. I do not agree. There you are you see, a perfect example of the way it is possible to establish contact with this family of fishes. They are not just brainless pretty creatures to me, they are capable of naughtiness, spite, curiosity, temper, cowardice and bravery in the face of adversity or attack. Anyway, there's a small challenge in the problem of soft plants, because the fishes behave, and consequently colour better, when given a surface cover of floating plants. The methods I've used to provide this cover have not yet pleased me so I'll not boast of them yet.

My conceit on the way I set up my tanks is bound-

less though, you'll be getting a description of that. Three inches of gravel. I must have my three inches of natural-looking gravel. My experience is that the roots of all my plants go romping away into three inches of gravel in nice white healthy weave. In the same way that I like to spread out in bed. My plants enjoy a generous home. Not just generous in room, but also generous in food supply. I understood the excreta from fish is converted into succulent mineral salts by bacteria within the gravel. Don't know about this, but I figure that the more gravel I provide, the more room there will be for bacteria and the greater chance of the breakdown keeping pace with production.

A family of *Melania tuberculata* (Malayan snails) heave about my gravel all day and distribute the muck among the bacteria. *Melania tuberculata's* rewards for all this delivery work are the leavings from the cichlids' meals plus the chance of becoming a meal themselves during their evening walk-about. The results of the combined efforts of bacteria and snails is a carpet of gravel that does NOT get coated in mulm and plants that grow rather well.

To be honest, I can't decide whether the reason for my success with plants is due to genius in snail and bacteria instruction, or the use of clear glass light bulbs. Stan Rawlins put me onto this by telling me that plants need infra-red light which they do not get from pearl or ordinary fluorescent bulbs. (You instruct snails by placing the opening of their shell close to your mouth and make a noise like the sea. Bacteria respond to small talk.)

With two *Plecostomus*, again of different species, to keep the algae under control, I've eliminated most of the chores of keeping my cichlids attractive. I have read that it is a mistake to keep two *Plecostomus* in the same tank so I applied my own "separate species" rule and it works as well on these cats as it does on my Happies. Two of them, and they are busy in view; one and it hides all day.

Which brings us from the tank to the actual *Haplochromis*. Five of them will be OK under three square feet of surface without the need for bubbles. My suggestion is three males, coloured but different species, plus two of the marbled females, again of different species. Records show twelve species that throw marbled females: three arrangements of

marbling. A pepper-and-salt effect, a broken but discernible window-frame effect or an inkblot-picture pattern. They may be on a gold or a silver background. True silver, not a generalised grey. We never catch any male fish in these marble colours. Sometimes we net hermaphrodite fish. I believe aquarium breeding may possibly produce marbled males. This has yet to be established.

Happy Vics. do not seem to need rocks and caves within their tank for territory but I think a tank looks more interesting with rockwork to complement the gravel and greens. Lumps of coal and sandstone are my favourites. If you are willing to provide a couple of stone structures, then a modified selection of fish could be: two males of the same species, one contrasting male, two females marbled but different.

From this you will get everything except breeding, which ought to restrict digging to small holes.

If you decide to have a breeding pair, I would suggest a four foot tank rather than a three foot. They will breed OK in three feet but you may be able to keep the tank looking neat if bigger. I would suggest nine inches depth for the gravel but this means building a special tank. If anybody is willing to try my next suggestions in a four foot tank, with nine inches of gravel under twelve to eighteen inches of water, I will be keen to hear the result.

Anyway, three inches or nine inches, my recommendations are the same. Set up your tank initially with rocks. Rocks about the size of your fist. Place them in a single layer on the base of the tank but remove three from a position six inches off centre and mid-way between front and rear glass. This will be the bottom of the digging area. Add gravel to fill the spaces. Add another layer of rocks, perhaps a little larger. Leave out more from over the digging area on each layer. Repeat with a third layer, etc. It should be possible for the fish to dig a basin-shaped hollow eighteen inches in diameter and up to nine inches deep where there are no rocks.

They are not stupid these animals. They will pick the easiest place to quarry so treat them as intelligent monkeys. All the gravel from excavating will be spat into the remainder of the tank, hence have your top layer of rocks waiting, with gaps between them: Happy cuspidors! There's no need to deprive the tank of plants. Use *Aponogeton* corms between the rocks and plant as many cryptocorynes as possible in all areas away from the edges of the hollow. If you build a miniature Stonehenge at the far end of the tank the cichlids will soon top it up with gravel. No matter how conscientious you are about cleaning the gravel, you'll need a power-filter to keep the water clear during breeding rituals. Burying the cryptocorynes does not seem to upset them at all, nor the aponogetons. Once the gravel-moving is completed, the plants grow to look very natural indeed. The

pair will breed in the hollow. (The best advice I can offer the aquarist is to ignore pH values and elaborate attentions. Just let them be.) The spawning has been described by Dr. Wickler along the following general lines. More or less.

The ripe female will join the male for the actual spawning during which she will gather her own eggs into her mouth. These eggs become fertilised when the male clouds the water in the hollow with his milt. Forty-eight hours from fertilisation the young hatch and are retained within the mouth chamber for nearly a month. The ocelli, or egg spots, on the male are made to look like free-floating eggs by having $\frac{1}{16}$ of transparent fin all round each spot. This border looks like a black line in most lighting and is a very definite male feature in *Haplochromis* for sexing them, even when they are small fry.

All sorts of ingenuity is called upon by aquarists to protect the young but I'm now getting into areas where my own experiences are small so I'll leave others to describe these.

No doubt there will be a massive demand now for a cubic foot of gravel, several fists of rocks and a breeding pair of Happy Vics. It's not that simple. To begin: these fish are so new on the scene that Phyllis and Alex Simpson, David, their right-hand man, and myself are the only persons able to identify them. Of more than 200 species described I feel inclined to name 12 males by sight and three only of the females. Perhaps I could identify males and females of three species.

In a catch of hundreds of Happy Vics., male species will all be different and colours form a major part of these differences. The females will all look much like each other in all the species. In general the shape and denture of related males and females is similar on a species, indeed they are defined in this way. All I have to do is look down the gullet of every fish I catch, count its teeth then compare the scientific descriptions with a sketch of each tooth. Not practical at this stage. My plan is as follows.

To collect a brood from the mouth of a female when they are about ready to swim free. Identify the female. Offer sexed pairs of these fry under the identity of the female. As and when the photographs of the adults become available, I will try to get them published, in colour. Meanwhile, I can supply verbal colour descriptions for a lot of species and you can buy them small, then wait for them to grow and gamble on seeing pretty fish.

It is obvious that I am trying to make cichlid keeping popular. Can I ask your help? Any of you who have kept cichlids *must* have experiences and opinions. Please offer them for publication. Good ones, bad ones, happy, sad ones, funny things, opinions. Rage, delight, disgust; but publish them you must!



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex.

TROPICAL QUERIES

by Jack Hems

Recently I introduced a small white clarias catfish into my 4 ft. community tank. It is feeding and growing well. But an aquarist friend, after seeing the fish, told me that I should remove it from the tank as soon as possible. He said that all clarias catfish are cannibal fish. Is this true?

Clarias catfish have huge appetites and a mouth to match, but small specimens are harmless. Large clarias catfish should be kept by themselves or with fishes too big to swallow. In all other respects they are no more cannibal fish than any other large-mouthed fish with a hearty appetite.

Can you please give me the name of a fish that would stay alive and healthy on a purely vegetable diet?

The sucking fish formally described as *Gyrinocheilus aymonieri* appears to flourish indefinitely provided it has a constant supply of mossy green algae to browse on.

I should be grateful for some tips on breeding the glowlight tetra.

All I can tell you about breeding the glowlight tetra is that very few aquarists manage it. Its essential requirements are a scrupulously clean aquarium filled with soft and acid water, not too bright a light, a temperature in the middle to upper seventies (°F) and bunched washed plants or a substitute for such plants as, for example, boiled willow roots or man-made non-toxic fibres.

I have about 25 young guppies in an 18 in. x 10 in. x 10 in. tank. My problem is that they do not appear to be making any growth although I feed them every day on live food and dried food. Can you give me any reason for this lack of growth?

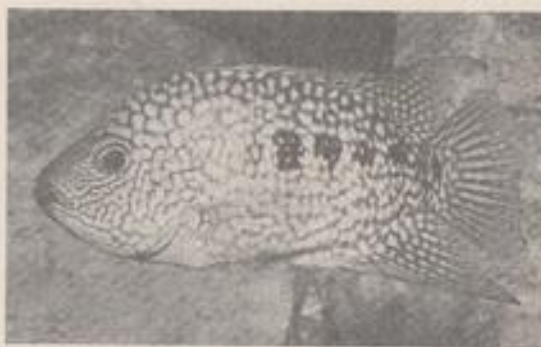
Ten young guppies are more than enough for an 18 in. x 10 in. x 10 in. tank. In short, your guppies are

showing the effect of overcrowding.

I should appreciate any information you can give me on the arapaima.

I trust you are not thinking about introducing this species into your home aquarium, for in the natural state in South America it reaches some 7 to 8 ft. and in captivity not less than 2 ft. Another of its drawbacks is that it requires a constant supply of small fishes to keep it from dying of starvation. *Arapaima gigas* is a member of the *Osteoglossidae*. Osteoglossids are distributed over much of the tropical world. A distinguishing feature of this family of fishes is that they have an elongated body covered with large bony scales.

Would a pair of Texas cichlids prove to be suitable fish to introduce into a 4 ft. tank already housing a pair of *Cichlasoma meeki*, *Aequidens latifrons* and spanner barbs?



Texas Cichlid (*Herichthys cyanogattatus*)

In its larger sizes, the Texas cichlid is a great bully. I advise you not to place it with your other fishes.

Can you tell me whether the featherfin tetra is truly peaceful, reasonably hardy, and easy to breed in average quality water?

The featherfin (*Hemigrammus unilineatus*) is quite inoffensive, has a range of temperature from the upper sixties to the middle eighties (°F) and is not too difficult to breed in any neutral to slightly acid water. The fry break free from the eggs within the space of three days, and two days later are ready to take flour-fine dried food and minuscule live food.

The appearance of my aquarium has been spoilt by a brown growth. This growth, however much I scrape it away, soon returns to cover the sides. The tank was installed in an alcove in our lounge and is illuminated by two 25 watt clear glass lamps in a home-made reflector hood. All the plants originally introduced have withered to shreds. What is wrong?

The trouble with your aquarium is lack of light. Allow 40 watts ordinary lighting for every foot-length of aquarium and you will see a vast improvement. Alternatively, fit a 20 watt warm white fluorescent lamp for a 2 ft tank or a 40 watt warm white fluorescent lamp for a 3 ft. or 4 ft. tank. Keep the light switched on for about ten hours a day. Plant up with *Cryptocoryne affinis*, *Microsorium pteropus* or *Sagittaria subulata* for satisfactory plant growth.

I have kept a spiny eel in a 3 ft. community tank for more than a couple of years. During this time it has hardly ever failed to approach the front of the tank towards the end of the evening and beg for food (earthworms). But just recently it has taken to hiding itself away in the compost (with just its head above the sand) and to the best of my knowledge, has not come to the

front of the tank for at least a fortnight. Do you think this fish is going to die (old age)? Or has it contracted some disease? I should like to have your comments.

It is a characteristic of some spiny eels to eat greedily for several weeks and then fast for a brief or protracted period. Most likely your eel is thoroughly enjoying itself in the sand. But do keep a watch on the aquarium at night, and if you see the fish swimming about or propped up in the plants, drop some worms near its snout. I think the sight of the worms will result in a resumption of its appetite.

One of my aquarist friends told me that the plant called *ambulia* gives out a substance that will poison fish. Is this correct?

Some botanist aquarium keepers have said that *Limnophila indica* (an uncommon species of the genus *Limnophila* once referred to as *Ambulia*) may contain a toxic sap. Hence several damaged stems in a small tank might possibly be dangerous to fish. Professor H. C. D. De Wit warns against introducing this plant in any quantity into a tank containing plant-chewing fish.

Is it possible to cultivate whiteworms in any other medium beside garden soil or peat?

I have heard of chopped sphagnum moss being used and, also, well-weathered sawdust, well-weathered tea-leaves, and shredded foam rubber (or a similar synthetic but non-toxic substitute).

Could I introduce South African frogs into my tropical aquarium without danger to the fish?

If you mean the large *Xenopus laevis* or clawed toad, then the answer is no. But there are pygmy species of *Xenopus* which should do all right in the tropical tank providing no very small fish are present.

COLDWATER QUERIES

by Arthur Boarder

Some time ago you reported that you were using white worms exclusively as a test for eight months. What was the opinion you formed as to their suitability?

I fed a few year-old fantails on white worms (*Enchytrae*) for over eight months and gave them nothing else at all. They kept in perfect health and the tank remained in good condition. I have no hesitation in stating that, in my opinion, they are a very safe and good food for fishes. I had read many wild statements about the use of these worms, such as that they make the fishes too fat and that they prevented them from breeding. I am too old in the tooth to take notice of all I read and always make a thorough test of any food which I might recommend. I have no time for the reports on fish foods which

state that, "My fish take this food eagerly," etc., as I know that most fish, if hungry, will take almost anything in the food line. Then the report goes on to describe what is in the food which can be read from the packet by any reader of the *Aquarist*. I have been testing a certain packet food for over twelve months and the fish on test have had nothing else from me. The fish have remained healthy and the tank water clear. No one can possibly test any fish food under a few months to make sure that the fish suffer in no way from the food.

I have recently obtained two fancy goldfish which I am unable to name. They are shaped like an Oranda but are silver in colour with a red head. Do you know what they are?

I think that the fish you have are known as "Red heads." They have a Chinese name I suspect as this strain has been introduced from China. A few years ago I saw a pamphlet issued by a Chinese promotion for a number of fancy goldfish which were illustrated in colour. They included a fish as you describe and also some with a silver body and a chocolate-coloured head. None of the fish depicted had an English name and I have not seen many of them in this country although one would have thought that by now many of these varieties would have become obtainable and popular over here.

I have made a garden pond and would now like to stock it with fantail goldfish. Can you send me some please?

I do not send any fish out as I live too far from a railway station which will accept them. I will give you the name of someone who does send out to any place, including Wales. However, December is not a good month for introducing fancy goldfish to an outdoor pond. Many of these varieties are reared under rather warm conditions and unless you were able to obtain some which had been kept outside for a few months I would advise you to wait until the spring before stocking your pond. At the same time I would not like to give the impression that goldfish of any variety are delicate and that a slight change of the temperature of the water would be harmful to them. It is one thing to put some colder water into a tank of fancy goldfish which is a few degrees lower than the tank water, but another thing to drop a fish suddenly into very much colder water than that to which it has been accustomed. I have a number of young fantails in tanks and I often remove a fair quantity of the water, which is at about 64°F, and fill up with tap water direct from the mains. This does no harm whatever to the fish and the next day they are feeding better than ever. This is a point I feel I must emphasise when considering the rearing of young goldfish. If the fish suddenly appear to go off their food, that is, they do not immediately come to the top to take it, then there is almost certainly something wrong with the water. In such a case it is imperative to change some of the water. The old idea that one should save the water when siphoning mulm from a tank and return it, is utter nonsense. A partial change of water once a week will keep the fishes in much better health.

We built a garden pond, 8 ft. 10 in. by 5 ft., and 23 in. deep with Butyl lining last July. We stocked it with various weeds and assorted fishes. They appeared healthy and a few youngsters were bred. Now some of the fish have what appears to be tail-rot. What is the cause and cure please?

I can only surmise as to the cause of the trouble but think that it is probably because the water in your pond has become foul. Whilst the water is in good condition the fishes are able to withstand any diseases and many pests because of their protective mucus covering. This covering (slime you can call it) helps the fish to resist many troubles, but once it becomes deranged or incomplete in any way, then the fish is prone to catch anything harmful which may be in the water. I am sure that the main reason why goldfish become ill in a pond is just because, at some time, their dried food has been given in excess. It only requires a little uneaten food to remain in the water for a day or two and the water starts to become polluted. With such a condition the fishes immediately go off their food. Then, if more food is given the condition goes from bad to worse. Unless the water is in good state with enough oxygen in it, the fishes cannot feed at their maximum. Their condition deteriorates and they are then unable to fight off any attack, especially anything like Fungus or fin-rot.

The pond probably requires cleaning out and when this is done do not start to feed the fish again until they show signs that they are in better condition. Goldfish will not die if they are not fed every day; I have had some go for months without any artificial feeding. Many pondkeepers forget that the appetites of their fishes decrease considerably once the water in the pond starts to cool down with the approach of winter. If the same amount of food is given as before then trouble will ensue.

I wonder if you can identify the specimens I have sent. I found three on one of my fantail moors in my tank. Could these parasites have been introduced with *Daphnia* with which I have been feeding my fish?

Although the specimens were dried up I was able, with the help of your sketch, to recognise them as Anchor worms, *Lernae*. These parasites could have been introduced into your tank and I expect that this is how your fish became infested. I have repeatedly stated that one can easily introduce harmful pests with *Daphnia*. If one rears them under strictly controlled conditions, then they can be a good food, but when caught from any pond in the wild any number of harmful pests and diseases can be brought in to your tanks. "Anchor worms" are not worms really but crustaceans. The parasites on your fish were females which carry the eggs. Therefore, if you remove the pests with tweezers you are likely to get rid of them as long as you do not introduce any fresh ones or their eggs. If you catch any fish with the parasites you can remove them with tweezers after having touched them with a spot of T.C.P., neat. Any wound caused will also benefit from the disinfectant.

In the wood at the bottom of our garden is a large pond. No fish can live in it as it is full of moss. What can I do to clear it?

The moss is what is known as flannel or blanket weed, a form of filamentous *Algae*. If left undisturbed it can become so thick that it chokes all other water plants and can make it impossible for fishes to find any swimming space. If the pond is very large it will be a problem to clear it. The weed can be killed by a preparation called Paraquat, but this would be fatal to any fishes in the pond. If a broken stick is twisted among the flannel weed large quantities can be pulled out. If the pond is too large for this then much can be removed by throwing in a grapnel-type hook on a rope and dragging it out. Three butcher's hooks straightened out at one end and wired together, make a good hook for clearing weed from a large pond. Once much of the weed is removed you can stock the pond with Carp, Rudd and Goldfish. Do not feed the fishes at all and they will almost certainly keep the weed down.

My fancy goldfish are attacked by a form of disease which I think is White Spot disease. There are fluffy patches on various parts of the bodies. What is this please?

The disease is not white spot. This can be identified by the many tiny white raised pimples on the fish. If the white is fluffy as you describe, it is certainly Fungus disease. This usually stands out like pieces of cotton wool and can spread all over a fish, usually becoming fatal when it reaches the gills. The usual salt bath can be tried as a cure. There are cures on the market advertised for this complaint but I have never tried them. I cannot remember having had a case of Fungus on any of my fish for at least the past thirty years.

When I did have any trouble with the disease I always found that I could cure it unless it had got too strong a hold on a fish. My method was to place the fish in a shallow container with enough water to just cover the dorsal fin when extended. I would then add sea salt (Tidman's), at the rate of a tablespoonful to a gallon of water. This was not stirred but allowed to dissolve gradually so that the fish could become accustomed to it by degrees. The fish was left in the shade until cured, which usually took four or five days. If the water became foul I changed it to one of similar strength. When the fish was cured I gradually reduced the strength of the solution before the fish was placed back in the pond.

PRODUCT REVIEW

Battery Powered Take Anywhere Aerator, a Fantasy "Special," distributed by Fantasy Pet Products Ltd., 13 Nutley Lane, Reigate, Surrey, price £2.87½, excluding batteries.

A reader of W.Y.O. recently wrote to ask me if I knew anything about a portable, battery-powered aerator. At the time I was unable to supply any information. Since then I have managed to trace the aerator and have tested a sample of it.

This air pump bears the label "Shakespeare Super 9960," and the words "oxygen pump" in three languages. It is no bigger than two 20 packets of cigarettes and will fit easily into the pocket. It has blue, plastic case which snaps closed. On the top of the pump is an air outlet on to which one fits the airline, and an on/off switch. The rear of the pump is

fitted with a metal hanger with which it can be clipped over the top of a tank or jar. The pump works on two 1½ volt batteries.

Under test I found that the little pump gave a good output of air, and would be ideal for aerating the water in jars or polythene bags, in which fish were travelling. It is quite quiet when operating and I found it to be most efficient. The pump is a little expensive when compared with one which runs on mains electricity, but its main value is that it will work anywhere. For those who show or transport fish this portable aerator would be a useful item, and the owner could probably think of other uses to which it could be put—e.g., the working of an aquarium vacuum cleaner in a tank which is normally cleaned by a motor filter which does not use an air supply, or the aeration of jars of Tubifex worms, etc.



THE BRITISH AQUARISTS' FESTIVAL,

will be held this year at Belle Vue Zoological Gardens Manchester on
SATURDAY 14th OCTOBER and SUNDAY 15th OCTOBER



Come and Join Us

I am a member of the "British Marine Aquarist Association" and I would like to take this opportunity of expressing my gratitude to the members concerned with forming this Association.

I not only find the Association and members (whom I met at the Annual General Meeting, 7th November, 1971) most helpful but it is a great step forward in the study of Marine flora and fauna and the promulgation of information pertaining to the hobby.

Therefore, I urge all Marine fishkeepers or people who are considering keeping Marines (we cater for the beginner as well as the experienced) to join this ever-expanding Association.

M. STRONG,
B.M.M.A. 51,
38 Plasturton Avenue,
Canton, Cardiff, CF1 9HH,
South Wales.

Plant Care

I expect many aquarists have bought plants which, when introduced to a newly set-up aquarium, died soon afterwards through lack of the natural fertilizer which the fishes produce. I have solved this problem in my tanks by using the small "rot away" pots many gardeners use. These are filled with peat, the roots of the plants placed into this and gravel sprinkled on the top to stop it escaping into the water. The pot is then pushed into the tank's gravel. After some time the plants' roots break through the pot and spread through the gravel. By this time the fishes wastes will be of sufficient quantity to support the plant. The pots I used were some small brown fibrous ones which didn't affect the pH or dH of the water. The small amount of peat made no difference either. But if you do adopt this method of introducing plants to your tanks, beware you don't use a pot which, when dissolved, alters the chemistry of the water.

DEREK BROWN (aged 14),
Marlborough Farm,
Falmouth, Cornwall.

Yellow Severums

I see that a Mr. Peter J. Smallman is interested in contacting anyone who has yellow severums. We

have a large number of these interesting fish. If he could contact us I am sure we could help him with as much information as he should require.

J. BYRNE,
Five Fishes Aquaria,
81 The Grove,
Ealing, London, W.5.

Calling All Cornish Tropical Fishkeepers

The Torpoint and District A.S. wish to extend their club into all of Cornwall and would like to hear from other clubs in Cornwall or persons interested in tropical fish. Please contact the Secretary, Mr. D. Medway, 20 Harvey Street, Torpoint. Phone: 302 or the Chairman, Mr. B. Selby, 25, Roselare Avenue, Torpoint. Phone: 702.

Flourishing Society

At Wakefield Prison in Yorkshire, there are a number of prisoners who are keen aquarists. With the Governor's permission and help of prison staff, they have formed a society: the "Unique Aquarist Society," Wakefield.

Our society has paid them a number of visits, which have proved highly successful. On one of these visits, it was suggested that an inter society show held at the prison, would be a very good thing. It would give their society the opportunity to see for themselves, the standard of fish on the outside.

Also to meet aquarists, and exchange ideas.

I have written to a number of local societies, and I have had very favourable replies, the date for this proposed show is in February.

I might add that the standard of fish that the "Unique A.S." have is high. They breed a fairly wide range of fish from livebearers, killifish, cichlids, and barbs. They also have a piranha, tinfoil barbs and a magnificent specimen of a pangasius cat. Any profit made in breeding is ploughed back into the society, for equipment and materials.

One of their members is in fact a well-known aquarist, he corresponds regularly with societies in America and Canada.

In conclusion, I hope this letter will be published, to bring to the attention of your readers, the existence of this society.

A. STENTON, Secretary,
Leeds Post Office
Aquarist Society,
1 Hawkswood Crescent,
Leeds, LS5 3PG,
Yorks.

Making Soft Water

Reference my article in the December issue of this magazine. Since the article was submitted I had reason to query the accuracy of the Scanco Kit that I was using. This was confirmed in due course by "Aquatic Hobby Ltd." of Slough; its exact in-

accuracy was not confirmed. They offered to replace it with another kit or refund my money. I chose the kit and received a "Durognost" test kit with which I tested the water run through my container and some stored ready for use.

	Seanco Kit	Durognost Kit
Water from Container	Zero ppm	2 to 3' 36 to 54 ppm
Water in Use and Stored	20 to 30 ppm	7 to 8' 126 to 144 ppm

I hope the above will serve to correct my article and may I add that I am truly sorry for any inconvenience caused.

K. G. WAKEFORD,
147 Framfield Road,
Hanwell, W.7.

Re This Year's B.A.F. at Belle Vue

Mr. Boarder, in his article about the show, was praising the dealers on their impressive displays and the numbers of fish for sale. What he didn't mention were those out to fleece the public with high prices for fish that are cheaper locally I list just four examples.

	Show Price	Local Price
Firemouth cichlids 1 in.	95p	25p
Flying Fox 2 in. . .	£1.30	70-80p
Brown Accaras 2 in. . .	£2.50 pr.	45p each
Kribensis 2 in. . .	£1.30-1.50	75p

Brown accaras are so prolific that in our society it is a standing joke that if a pair are left in the same bag they will spawn on the way home. A pair I sold recently produced something like 8,000 youngsters which I was forced to feed to other fish because I was unable to sell them all but the odd dozen that is so where £2.50 pr. was arrived at heaven knows.

One stand had a display of male siamese fighters and out of approx. 50 on display 12 were dead and had been for a day or two judging by the mould on the corpses. Which shows complete disregard for welfare of the stock in trade which no self respecting aquarist would do.

I fully realise the dealers must show some profit for their time and trouble but there is a difference between profit and exorbitance.

Disillusioned and Disgusted.

G. CHADWICK,
Stretford and District A.A.,
17 Beverley Road,
Swinton,
Manchester, M27 1HZ.

WEST GLOUCESTERSHIRE AQUARISTS CLUB

The above Society was formed on the 20th December last. The acting Secretary, Mr. D. A. Wiltshire can be contacted at his home address which is 15 Oakhill Road, Mitcheldean, Glos.

Will prospective members please enclose S.A.E.

PRODUCT REVIEW

Hobby Complete Brine Shrimp Hatching Kit, distributed by Interpet, Dorking, Surrey, price £6.40.

This is a very sturdily constructed kit for the hatching and raising of brine shrimp. The kit consists of a rigid, clear plastic tank of about 10 in. x 5 in. x 6 in. This is fitted with the airlift supplied. Other elements include an airline, a separator with a fine gauze filter, a plastic bottle with an airline fitted in the screw tap and a capped outlet at the bottom. A white plastic support for this bottle is also included as is a polythene bag of specially prepared salts and a plastic container of "culture food," etc. It is rather difficult to give a lucid "picture" of the various items as these really need to be seen to be understood. There are two leaflets supplied with the outfit; one of these contains 19 clear illustrations of the steps to be followed in using the kit. The other leaflet gives instructions and information in English—but the front cover of this leaflet is printed in German, as is that on the "food" container,

and, as I don't read German, I was only able to guess at what the labels on these stated. The outfit requires a supply of air to operate in the way in which it is illustrated in the visual leaflet, and a temperature of between 20°C to 30°C is appropriate. Light is not required.

This unit is certainly excellent for hatching brine shrimp if the instructions are followed. Unfortunately, because of lack of time, I have been unable to continue raising newly hatched shrimp to adulthood, but, following the directions supplied with the outfit, this would appear to be quite a simple and interesting task.

Although this outfit is relatively expensive, it should prove most useful to those aquarists who like feeding young fish—or larger fish—with brine shrimp. Because of the sturdy construction of the separate parts, the unit should last indefinitely. The kit is illustrated in Interpet's latest retail price list, and extra supplies of special salts and food are available.

B.W.

BREEDING THE NEON TETRA

by J. Lee

SPAWNING. This little gem is still a very difficult problem fish and in my early days of fish-keeping it became that much of a hazard trying to get neons to breed, I began to feel it was impossible. In the old days this species was high in price and I have paid up to £1.50 a pair when buying breeding stock. Over a period of eight to nine years I tried to breed them in various sized tanks such as angle iron tanks 14 in. x 10 in. x 10 in., 18 in. x 12 in. x 12 in., up to 24 in. x 12 in. x 12 in. and on all occasions I had failed. While resting at home one weekend, I spent a full day going over everything I had done and tried to iron out any obstacles and problems which may have been the cause of the fish failing to spawn but after eight hours or more, thinking till my head was dizzy, I was no nearer solving my problem. But the will to breed them drove me frantically on with the challenge and obsession stronger than I had felt over any fish before. I finally settled down to what I thought at the time to be a series of unorthodox methods involving trial and error after checking on temperatures, light position, pH values and dH and water but I was still baffled by failure. I then got down to really serious business and experiments. I suddenly made my mind up that angle iron tanks were out from now on so I switched to a small wood tank I had at the time made from resin $\frac{1}{2}$ in. plywood. I had made it 18 in. x 10 in. x 10 in. After several hours of painstaking scrubbing and setting up, another attempt to breed them was tried and this time the fish seemed to like the set-up for within two days they spawned. I blacked the tank out with thick brown paper and crossed my fingers for luck. A few days later I removed the paper only to see the agonising sight of about 200 eggs which had all turned white with fungus. After so many failures which had never seemed to end I felt a little disheartened and dejected and I decided it was time to give up for a while trying to breed the neon tetra.

After the first four early winter months had slipped by I got the strong feeling to try again. I started first with a small all-glass battery tank which, incidentally, was not very clear glass and measured 14 in. x 8 in. x 10 in. This time, I used for spawning medium some well-washed willow roots. Once again a few days after putting a fit young adult pair of neons out with the female bulging with eggs, the

same sight greeted me. About a hundred eggs or more, all white. After leaving the tank for well over a week hoping, perhaps, just to see one or two fry (but alas nothing), I again had to accept defeat. So I began again plodding on against the odds. My first job was a slight change in the conditioning programme. For two months I kept the sexes apart, feeding twice a day on a diet of fine red *daphnia*, small ghost or glassworms, *tubifex* chopped up, small white worms, grindel worms, micro worms, brine shrimps, small crushed snails, scraped meat, also scraped liver. A small addition now and again of salted shrimp-paste and pulped tiny bloodworms. On this diet the females began to get to bursting point with eggs making ridges on the sides of the stomach stand out so once more the time had come to try again. On this special occasion a very small thick glass vessel, or you might say, salad dish, was selected. I had two which I bought from a shop with neons in mind. The sizes were 10 in. long by 7 in. wide and 5 $\frac{1}{2}$ in. deep, rounded corners, glass thickness $\frac{1}{4}$ in. Very small containers indeed. My wife laughed and remarked that there was hardly room for a pair of neons to turn round in never mind spawn. However, this did not deter me at all. After painting black all round outside, just leaving the front clear, the vessel was highly disinfected with a strong solution of permanganate of potash which had stood for two hours and then carefully cleaned out. The water used on this spawning was pure filtered rainwater which had stood for eight months in a water butt with peat moss and was amber coloured with a reaction of 6.5 not exceeding more than 2dH. It's my opinion that for good results the neon tetra needs sparkling crystal-clear soft acid water. I emphasise this point very strongly and everything used in the tank was either scalded with boiling water or highly disinfected as every precaution must be taken to prevent bacteria and dim light and acidity are both anti-bacterial measures. The bottom was left bare; for spawning medium a small clump of fine *Fontinalis* rinsed in a solution of alum (strength one tablespoon to a gallon of water) was then placed in the centre of the tank. The temperature at the time of spawning was a little below (73°F.) (23°C.). The breeders were put in at dusk with a few crystals of salt added; the tank or vessel was allowed plenty

of light all the next day then on the first evening was blacked right out with thick brown paper, leaving about 2 in. at the front. Neons breed in a swift back and forward motion, side by side; eggs being adhesive remain on the plants. When spawning was completed the pair was removed as I found they were avid egg eaters. So after a few days had elapsed out of miserable failures in the past at last came success. This was, for sure, one of my happiest moments. I had indeed won in the end. This first batch produced a hundred fry. Surprising, really, in such a tiny tank, but this is the best method I've found and still use it today. The eggs hatch in 36 to 48 hours and produce what must be some of the finest fry on record. They look very fragile and transparent and if there's not a good tight top on the tank, the faintest draught will wipe the lot out. Owing to their tiny mouths and stomachs, one should feed very sparingly as uneaten food sets up swarms of bacteria which will soon pollute the tank. At three or four weeks old baby neons get a faint touch of pale pink colour which develops further into an intense red. The lower part of the body has a bluey-green and an electric blue line; then after two months or so you are able to see the colours more plainly and they begin to look like tiny replicas of their parents. The fry were fed the first two weeks on infusoria, yolk of hard boiled eggs and liquid

fry (egg layers) then on to brine shrimp, micro worms and small sifted dry foods such as Farex cereals. After six weeks or more they were taking grindel worms, tiny crushed snails crushed with worm shredders, and sifted daphnia. Then after this stage it's more or less plain sailing. Just a few sensible pointers on breeding this species: never swap the fish over quickly from their quarters into very soft water. This proved fatal in every case. It must be done very gradually. Also, any unsuitable water containing bacteria or impurities will not do as if they do spawn the eggs will not hatch; they will disintegrate in the water owing to the shells of the eggs being so delicate. For these species cleanliness in every department is a *must*.

I have, over the years, used different water with success such as mixed pondwater and distilled. That is, pondwater which does not exceed more than 3 d.H. Pure filtered rainwater and some spring waters are also useable. Water from lakes will sometimes work, provided its not hard or alkaline. Even some tap waters will do if softened to suit. The same water I use for these fish is also the water I used to breed my Cardinal tetras only with the difference that the water is more acid and brown than for neons. Even today they are still a firm favourite and problem fish but if certain careful rules are followed they can be bred.

THE AQUARIST
& PONDKEEPER
FISHKEEPING
EXHIBITION

Make a note of the date
15th-16th JULY 1972
AT
ALEXANDRA PALACE
WOOD GREEN
LONDON N22

Trade enquiries to :-

J. E. YOUNG
THE AQUARIST & PONDKEEPER
THE BUTTS, BRENTFORD,
MIDDLESEX TW8 8BN

The Annual Fishkeeping event
sponsored by this magazine and
organized with the co-operation of
The Federation of British Aquatic
Societies.

WATCH FOR FURTHER DETAILS

COLOUR IN GOLDFISH AND KOI

by F. L. Vanderplank, Ph.D.

ALL the uncoloured (or wild) carp from which Goldfish and Koi have originated are an olive greeny brown in colour. Many Goldfish bred in ponds and aquaria in this and other countries are said to revert to their natural colours; a varying proportion of Fancy Goldfish and Koi's offspring do certainly appear in their original wild-type colour but this cannot be claimed as a genetical reversion since it can be shown to be dependent upon the temperature at which the eggs and fry are reared and does not follow any genetical law. However, other characteristics such as shape, fin-shapes and pigmentation do follow expected genetical ratios. Goldfish and Koi have three types of pigmentation which have been named rather misleadingly as metallic, matt and nacreous. The normal goldfish is what is termed metallic, which is said to be due to pigmentation and a reflective substance named guanine; in the matt condition guanine is absent and pigmentation is often considerably reduced. Both these conditions exist in "uncoloured" (or naturally coloured) Goldfish and Koi, although I have not seen this stated in print so far. When metallic individuals are crossed they produce all metallics and similarly, matts crossed with matts produce 100 per cent matts, so both these types are homogenic, one having guanine and the other being without guanine. Now, when a metallic is crossed with a matt, all the offspring have one gene metallic and one gene matt and produce a half-way stage which is widely called nacreous (example: shubunkins and calicos), this is a heterogenic stage and results in what is a patchy fish with batches of pigment and guanine in areas of no pigment and no guanine. This condition also exists in naturally coloured fish but generally is difficult to see without special lighting conditions or without microscopical examination of the surface layers and scales of the fish. The genetics of breeding nacreous fish follow the usual Mendelian laws. There are two other conditions that occur in Goldfish and Koi. One is the presence of a black pigment or melamine and the other is areas where extra heavy deposits of guanine occurs giving the fish a truly metallic appearance, for example usually on the back and caudal area of Lionheads and all over in truly metallic Koi. During the last few years I have bred many thousand Goldfish and Koi and have reared

these under various controlled conditions and have found say, when a pair of metallic Lionheads are crossed that the numbers of offspring colouring (by which is meant any colour other than the natural olive-green brown) depend entirely on the temperature that the eggs and fry are reared. When the eggs are hatched and reared at temperatures that do not exceed 65 nor fall below 55 F, over 95 per cent of this particular cross have remained in their natural wild colour, and using part of the same batch of spawn, those hatched and reared at 78-85 F were 95 per cent coloured before they were a month old. Temperatures between these two extremes gave proportional percentages. With Koi the findings are even more dramatic. At temperatures below 60 F most of the eggs failed to hatch; using the same batch of spawn the portion kept at 65 F about 50 per cent hatched and all surviving fish were uncoloured at 6 weeks old when they were from one to one and half inches in length. The portion kept at 70 F gave about 25 per cent which failed to hatch and about half of the survivors were coloured at 6 weeks old. The portion kept at 78 F gave a near perfect hatch, no failures being noted and most of the young were coloured from hatching and 98 per cent were fully coloured at 6 weeks old. Similar results have been obtained with crossing matt with matt and metallic with matt; in the latter case if the uncoloured (or naturally coloured as they should be properly called) fish are examined carefully it will be seen that they are mottled but the pigment being all one colour (olive-green brown), the mottling is due to a variation in the presence and density of pigment and guanine. Many of the "uncoloured" fish in the above experiments coloured up as they got older and, as many books state, may colour at 3 to 4 months, others colour up at one, two or three or more years of age, it would appear that this colouring often takes place when there are definite temperature changes in the water. The black in most domesticated fish is often stated to be due to a cancerous substance; this is not correct; it is due to a form of the natural guanine which appears to be infected by a virus changing it into melamine. Any black in Goldfish and particularly Moors changes to red after a period of time. Moors generally change to red between 3 to 6 years old and red "Moors" when

crossed generally produce the best Black or true Chinese Moors. However, black in Koi appears more permanent, but not completely permanent and all very large Koi I have seen or heard about have lost most of their colour and become white.

Variiegated plants, those with white and green leaves, or yellow and green leaves, or with some plants like *Tradescantia* pink and purple with white and green, or with the multicolours of Croton leaves, all these unnatural colours (or absence of colour as white) are caused by viruses and can be transmitted to the plants by special methods. The shape and colour of many flowers are due to viruses; these viruses do no serious damage to the plant but naturally when a proportion is taken up by a non-pigmented area it is useless for producing food for the plant, so variegated plants are slower growers than those not so virused.

All the evidence with Goldfish and Koi suggests that the colours other than the natural one, is due to a virus which affects the pigment of the fish. Whether the resultant colour is white (pearl), yellow, orange, reds, blues or other colours depends on the variability in the

chemical nature of the pigment which is not one simple chemical substance but a combination of various chemicals. These become isolated and separated in the nacreous type of fish, hence the colour of the Shubunkin and Calico. Black in Goldfish (Moors) would appear to fall victim to the virus as the fish ages and generally goes a deep red. The Black in Koi is probably a different chemical from the melamine in Goldfish and is more resistant to the pigment virus that causes the colour changes. The increased deposits of guanine that causes the real metallic colouring in Koi and some Goldfish varieties is most likely due to another virus similar to the one that causes formation of melamine or the black colour of Goldfish.

Many domesticated tropical fish have now been bred in reds and I suggest this is possibly due to the introduction of the same or similar virus that affects Goldfish.

The fact that the unnatural colours of Goldfish and Koi is due to a virus and not due to genetical changes will open up exciting new possibilities in the development of these picturesque if unnatural fish.

THE SILVER NEEDLEFISH (*Xenotodon canila*)

by T. J. S. Straight

ABOUT THREE MONTHS ago, I was visiting a local aquarium shop. The owner, a personal friend, showed me one tank, where there was a magnificent five inch needlefish, lurking under some floating duckweed. My friend scooped a female guppy out of another aquarium and put it in with the silver needlefish. At first this extraordinary fish remained motionless, not even noticing the guppy, but then, suddenly, he struck. He grabbed the unfortunate guppy in his long thin mouth and worked it down his throat. Within seconds, the body had completely disappeared. I could not possibly afford this fish at the asking price, but a month later, the owner still had not sold him, and was despairing of ever doing so. Eventually, we came to an agreement; I was able to buy it for a quarter of the retail price.

After reaching home, I placed the needlefish in a bare eighteen inch plastic aquarium. When he had settled down, I was able to get a good look at his markings and general shape. He was long and thin, and nowhere, did he have more than half an inch body diameter. His colouring was not particularly striking; the top half of the body is light brown and the bottom has a silver sheen. Joining the two is a dark black stripe, quite thick, reaching from the eyes to the base of the tail. The unpaired fins are comparatively large, and situated at the end of the

body. The pelvic fins are extremely small and practically useless, and the pectorals are almost invisible. Other interesting features are its eyes and the mouth. The eyes are large, obviously for locating its prey, while the mouth is lined with needle-sharp teeth for scaring off large fish and eating small ones. He only eats live fish, treating all other food with contempt, even daphnia and tubifex.

After a month, I moved him into a four foot bow front aquarium, filled to a depth of six inches with slightly salted water. The plants were water ferns and duckweed for him to hide in; the lighting a 30 watt grolux tube. He seemed happy at a temperature of 75°F, taking a couple of small guppies every day. No filtration or aeration is necessary, and changes of water are few and far between. The only problem is food. A constant supply of one inch fish is needed. This means breeding guppies by the hundred, or persuading your local dealer to give away any of his sick fish. One petshop owner helps me a lot in this way.

Now, my fish is nearly seven inches long and takes three or so fish a day. He is the only specimen of silver needlefish I have ever seen, but I presume there are others. They are interesting, but expensive fish to keep, but well worth the trouble.

News

from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

THE first meeting of the Manchester Section of the **Fancy Guppy Association** to be held at the new venue (Tudor Room, Longlight Hotel, Belle Vue, Manchester, first Sunday each month, 2.30 p.m.) was the Section's Annual General Meeting. The following committee holds office for 1972: Chairman, R. Young; secretary, P. Campbell (37 Cardigan Drive, Bury, BL9 9LG, Lancs.); treasurer, A. Charlton; show secretary, J. Hesketh; assistant show secretary, D. Glen; F.R.O., T. Hallett.

FIFTY members and visitors were present at the December meeting of the **Keighley A.S.** for the annual Juniors' evening, when the Juniors took complete control and held an auction of fish and equipment, and judged the table show. The results were: Fish of the Month: 1 and 2, Mrs. Gess; 3, Mr. Heap. Any Other Variety: 1, Mrs. Heap; 2, Mr. Ibbotson; 3, Mr. Hinds. Junior A.V.: 1, Master Jones.

A TALK on Characins was given at the December meeting of the **Privateers A.S.** (Shipley) by J. Hemmingway, of Batley. This meeting had a larger than usual attendance, and the audience was very appreciative of a fine and informative discourse.

ABOUT thirty members enjoyed a very interesting talk on Filtration given by B. Taylor, at the December meeting of the **Plymouth District Aquarists and Pondkeepers Society**. Table Show results were as follows: Livebearers (ex-Guppies): Novice: 1, Mr. Kendall (Swordtail); 2, R. Loscombe (Swordtail); 3, Mrs. Horswell (Mollie, black); 4, Mr. Chubb (Swordtail). Premier: 1, Mr. Hoskings (Platy); 2, J. Rundle (Swordtail). Best in Show: Mr. Hoskings (Platy).

A MEETING of the **C.N.A.A.** will be held on 20th February at 2.30 p.m. in the Gabaifa Community Centre, Cardiff. Agenda: 1, Re-election of Committee; 2, Welsh Open Show. It is in the interest of Welsh Clubs that as many people as possible be present.

WINNER of the **Hford & District Aquarists' & Pondkeeper Society Home Aquaria Competition** for the past three years, Den Scaman, gave a detailed and precise talk on the pitfalls and problems of setting up an aquarium for both competition and domestic purposes at the December meeting. A large number of

visitors and new members were present at this meeting and found a good deal of information forthcoming from the lecture and questions afterwards.

DURING the past few months **Llantwit Major A.S.** have been very active. First an inter-club contest against Port Talbot was won by a small margin. Then came the annual table show for the club trophies, the results being A.O.V. Egg-layers: 1 (and Best Fish), S. Nelson; 2 and 4, A. Ibbotson; 3, R. Gordon. A.O.V. live-bearers: 1, R. Wigg; 2 and 3, J. Thomson. Breeders livebearers: 1, A. Ibbotson; 2 and 3, R. Wigg. Breeders egg-layers: 1, S. Nelson; 2 and 3, A. Ibbotson.

In October the annual dinner was held and also in October there was an inter-club contest with Rhondda which was lost by a few points. In November a club table show was judged by Glin James, the results being as follows: Class A: 1, Helen Jones; 2, J. Edwards; 3, R. Wigg. Class B: 1, 2 and 3, R. Wigg. There was also a talk by W. Gorwill on Mouth-breeders, which was very interesting.

THE December meeting of the **Harrogate & District A.S.** was well attended and there were also seven new faces present. The judge for the table show was unfortunately unable to attend. He was Mr. Moorhouse and is the only judge who has notified the Society that he would be unable to come along. The Society has been let down, on many occasions, by different judges who had promised to judge and then have not turned up, and have also failed to inform the Society. Judging the table show were Mr. Smith and Mr. Pendleton, both Society members, and the results were as follows: Rasboras: 1 and 2, Mrs. Atkinson; 3, Mr. Masson. A.O.V.: 1, Mr. Pegnall; 2, Mr. Levett; 3, Mr. Slater. Juniors A.O.V.: 1, Master Groves; 2, Master Steacy; 3, Master Lee. The committee also thanked Mrs. Briggs for all she has done over the past twelve months for the Society. She is leaving Harrogate this year.

AN interesting talk was given by Ron Trench at the **Horsforth A.S.** December meeting. He also brought along with him his large catfish.

The usual table show was held with Mrs. Dickinson getting the monthly trophy with a very nice coldwater fish. Mrs. Dickinson was also first in the A.O.V. Specified class and M. Ott first in the A.O.V. The meetings are held the first Monday in every month. For details contact Mrs. B. M. Helm (Hon. Sec.) Tel.: 21025 Leeds.

INTERESTING talks, films and outings had assured the **Erith and District A.S.** of a good year's entertainment. This was mentioned at the Annual General Meeting held recently and there was also a small profit in hand. At the December meeting Mr. Harrison, a F.B.A.S. judge, kindly consented to judge the Club's

"Champion of Champions" class of various tropical fish, F. Squires was the winner, Mrs. B. Scates being second and R. Wildred third, T. King gained fourth prize. Mrs. J. Squires remains as the hard-working secretary, and the Club is always pleased to receive show schedules and inquiries for membership at her address which is 30 Woodhurst Road, S.E.2.

SLIDES of different types of fish was the subject of a quiz between members of the **Wellingborough and District A.S.** at the December meeting. The winner was R. Cooper with P. Crossfield and P. Wallis runners-up. The table show results were as follows: Any Variety Tropical (Pairs): 1, E. Rossiter; 2, D. Bichenor; 3, P. Crossfield. Tropical Catfish: 1, D. Bichenor; 2, Brenda Phillips; 3, J. Baker. Both classes were judged by D. Page of Corby. The trophy for the "Prettiest Fish" was won Mr. Waller.

DESPITE the inclement weather the **Hendon Congress** was again an outstanding success. Three hundred were present and over 35 societies were represented to hear A. Fraser-Brunner's lecture.

THE **Rushden Fishkeepers Association, F.B.A.S., E.M.A.A.S.**, at their Annual General Meeting elected Mr. and Mrs. Bert Jeffs as joint presidents of the Society. Officers and committee elected for 1972 are: Chairman, F. Gibson; vice-chairman, D. Pattison; secretary, C. M. Evans, 81 Trafalgar Road, Rushden, Northants; treasurer, Mrs. Joan Gibson; Committee, Miss Cooper, Measra-Burgess, Newitt, Rowell, Clarke, Mead and Debon. Meetings will now be held on the first and third Wednesdays of each month at 8 p.m. at Horrell's Social Club, Fitzwilliam Street, Rushden, Northants.

THE main item at the Christmas meeting of the **Bournemouth A.S.** was a comedy quiz, entitled "Fish Associations," and had been compiled by Les James and the chairman. There was no Table Show, and after the interval there was an auction, and a raffle. There was a good attendance of over thirty members, who took part in a general discussion during the remainder of the evening.

AT the **Castleford and District A.S.** third annual open show, the Trophies and Prizes were presented by the Mayor of Castleford "Ald. McLoughlin." The Aquarist Gold Pin and the "Aquaria International" Trophy, were won by J. Mosley of Keighley, for the best fish in show with a Toothcarp. Mr. and Mrs. Cohen of Castleford A.S. won the "Gladstone Press Trophy" for "Best Exhibitor." Other results were as follows: Guppies: 1, G. Gillespie (Castleford); 2, L. Kirlew (York); 3, B. Whitelaw (Dukeries). Swordtails: 1, Mr. Stubler (Hull); 2, D. Jones (Rotherham); 3, T. Douglas (Hull). Platies: 1, D. Barret (Castleford); 2, M. Hillop; 3, P. Booth. Mollies: 1, L. Leadbetter (Hleetwood); 2, Mr. and Mrs. Toyne (Sheffield); 3, J. Igoe (Sherwood). Small Barbs: 1, P. Carey (Yeek); 2, Mr. and Mrs. Blizard (Sheffield); 3, M. Rees (Ind.). Livebearers (Pairs): 1, Mr. and Mrs. Cohen (Castleford); 2, J. Igoe (Sherwood); 3, B. and I. Heptinstall (Castleford). Egg-layer (Pairs): 1, M. Clark; 2, Mr. Shanks; 3, Mrs. P. Heptinstall. Livebearer (Breeders): 1, G. Andrews; 2, Mr. and Mrs. Cohen; 3, G. Gillespie. Egg-layer (Breeders): 1, W. Batley; 2, M. Curchan; 3, Mr. and Mrs. Gates. A.O.V. Tropical: 1, D. Kennedy (Bradford); 2, Mr. Sullivan (Four Star); 3, I. Stevenson (York). Toothcarps: 1 and 3 and best in show: J. Mosley (Keighley); 2, M. A. Crowthier (Swillington). Small Anabantids: 1, Mr. and

BE PREPARED
 always keep a packet by you
Hillside Aquatics London N12

Mrs. Blizard (Sheffield); 2, L. Leadbetter (Pleerwood); 3, Mr. and Mrs. Cohen (Castleford); 4, Mr. and Mrs. Foxes; 1, J. Scari (Silly); 2, T. Bilton (Ind.); 3, G. and G. Thickboom-Darwin and Rashoras; 1, B. and I. Heppinstall (Castleford); 2, Mr. Sewel (Sherwood); 3, B. Downing (Sherwood); Carps and Minnows: 1, I. Stevenson (York); 2, M. J. Singleton (York); 3, P. Buxton (Aireborough); Loaches: 1 and 2, Master Igoe (Sherwood); 3, K. Prew (Castleford); Corydoras: 1, Mr. Sewel (Sherwood); 2, J. Mousley (Keighley); 3, P. Booth (York); A.O.V. Catfish: 1, Mr. and Mrs. Low; 2, P. Shipley; 3, Mrs. Caskie; Large Barbs: 1, Mr. and Mrs. Cohen (Castleford); 2, Mrs. Stone; 3, Mr. Shanks; Small Characins: 1, Mr. and Mrs. Richardson (Ind.); 2, Mr. Hickline (Alfreton); 3, E. Buxton (Aireborough); Dwarf Cichlids: 1, H. Kuhn (Lincoln); 2, J. A. Whiteley (Aireborough); 3, G. Gillespie (Castleford); Large Cichlids: 1, Mrs. M. Igoe (Sherwood); 2, Mr. Sewel (Sherwood); 3, Mr. and Mrs. Gates (Castleford); Large Anabantids: 1, Mr. Sewel (Sherwood); 2, Mr. and Mrs. Cohen (Castleford); 3, Mr. Newsworthy (Peters); Fighters: 1, Mr. and Mrs. Low; 2, M. Tong; 3, C. Assuth; Fancy Goldfish: 1, 2 and 3, J. S. Hall (Aireborough); Goldfish: 1, J. S. Hall; 2, Mrs. Igoe; 3, M. Clark; Juniors A.O.V.: 1, D. Sharp (Castleford); 2 and 3, D. Stevens (Castleford); A.V. Female: 1, P. Booth (York); 2, P. Heppinstall (Castleford); 3, H. Blades (Greenwell).

AT the recent annual general meeting of the **Federation of British Aquatic Societies** the following Council members were re-elected: Messrs. Brown, Carter, Jordan, Pyc, Tomkins and Towell. The Officers and Council members for this year are: Chairman: R. D. Eason; vice-chairman: F. Tomkins; general secretary: K. J. A. Pyc; Assistant general secretary: W. R. Sherwin; Treasurer: R. Dove; B. Baker; A. Blake; C. A. T. Brown; M. Carter; T. Glass; L. Jordan; R. Mills; H. Towell.

The total of affiliated Societies reached well over 120 and already several Societies have re-affirmed their support for 1972. The Trophy Secretary T. Glass made his yearly plea for applicant Societies to conform to the Rules when requesting FBAS Championship Trophies for their open shows—rough draft of open show schedule, date of show, list of judges, proof of affiliation, and a clean record of past trophy reports—all by the middle of February. Also, in time for the '72 season, an additional publication from the J. and S. Committee—another selection of aquarium fishes in the Show Fish Guide series. For the "Fish Widows" there is the Federation Dinner, Dance and Social evening on the 8 April at Highgate.

RESULTS of the recent table show of the **Sittingbourne and District A.S.** were as follows: Breeders Class: 1, Mr. Palmer (Sword-tails); 2, Master P. Bean (Thick Lip Gouraminis); 3, Master G. Morris (Highers); Seed Pairs: 1, 2 and 3, M. Scott; 4, Mrs. E. MacDonald. The show was judged by D. Simpson.

THE final evening's entertainment of the 1971 season at **Ealing and District A.S.** (FBAS) took the form of a judging competition. The table show classes concerned were Guppies, Platies, Swordtails and Mollies. Harry Towell (FBAS) did the official honours and then the members took over. Trophy Class winners of the season were: J. Healey, Irvine Trophy; I. Batts, Mills Trophy (plants); J. Irvine, K.O. Cup; R. Sears, Dwarf Cichlid Trophy; J. Batts, Ankin Challenge Shield.

COMMITTEE elected to serve this year of the **Yate and District A.S.** were as follows: Chairman: D. Walsh; secretary: T. J. Green, 185 Station Road, Kingswood, Bristol; Treasurer: B. Snell; show secretary: M. Emery, 134

Sundridge Park, Yate, Nr. Bristol. Show manager: R. Bennett; Programme officer: P. Wright; reporting officer: M. E. Ridge; floor members: Messrs. P. Feely and S. Green.

THE **Whitley Bay A.S.** held their bi-annual show in December at the R.A.F.A. Club. There were 28 jars on show, the award for best fish on show going to J. T. Burns who showed a magnificent Marbled Angel Fish. The bi-annual shield was won by A. Lisle of Hlyth. The society was fortunate to have as judge Gordon Lowthian, who is an authority on tropical fish, reptiles and aquatic plants. Mr. Lowthian gave a most informative report on each entry, the society also welcomed members of the R.A.F.A. Club in whose premises the meetings are held.

THE December meeting of the **Fancy Guppy Association** was devoted to the children, who thoroughly enjoyed the party organised by Miss A. Jackson. There were prizes for everyone and plenty of food as well. The grand draw took place the winners were Mrs. E. Pilbeam; Mrs. Gilbey and B. Lindsey. There was the usual table show for Guppies judged by the Secretary, Mr. R. Elmes. Any further information on the Central Sussex Section may be obtained from the Secretary, Mr. R. Elmes, 254 Sunview Ave., Peacehaven, Telephone 2534.

AT the December meeting of the **Mid Sussex A.S.** the Chairman returned after three months' absence due to work commitments. There was the usual auction after which Mr. Soper gave a very informative talk on General Breeding of Tropical Fish.

A few members set up show tanks (10 x 8 x 8 inches) to be judged by all those that did not enter. The prizes were won by: J. Walker; D. Soper; N. Short; P. Ratcliffe. There was also a plant show judged by C. West (Treasurer) who awarded the prizes as follows: 1, J. Walker; 2 and 3, D. Soper; 4, C. Corbin. The home aquaria results were: D. Soper (Senior); L. Edwards; N. Short; J. Walker; C. Corbin. Special: S. Taylor, Cold Marine. Junior: L. Temple; P. Johnson; K. Brille; D. Ransom; T. Brille.

NEW officers for **Bethnal Green A.S.** 1972 are as follows: Chairman: J. Gower; secretary: P. Arnold, 24 Rawson House, Skipsworth Rd., Hackney, E.9. Show secretary: D. Bundy, 30 Eversham House, Old Ford Rd., Bethnal Green, E.2. Meetings every Tuesday 7.45 p.m. Bethnal Green Institute, 229 Bethnal Green Rd., E.2.

EARLY in December **Hyde A.S.** were hosts to Glossop A.S., Ashton A.S. and Valley A.S. in a four sided table show, which was judged by I. Wood, Bury A.S. There was also a very interesting lecture given by R. Trench on Foods and Feeding. Best fish in show was won by D. Haldow (Hyde).

ON Tuesday, 15 February, the **Aberdeen A.S.** will hold its monthly meeting in the Y.M.C.A. rooms at 7.30 p.m. The evening will have a slide show under the general heading "Marine Fish." Completing the marine theme, there will be a panel discussion on Marine Problems, relying on "audience participation." The show classes of the evening are for Single Gourami and Single Catfish.

RECENT activities of the **Pisces Aquarist Club**, Bournemouth, have included a visit to Brighton and a Christmas Party at the end of November. The Breeding House is now well established and experiments are being carried out with various water temperatures and also pH and hardness variants. A provisional programme for this year has been made out as

follows: January, visit to Salmon Hatchery; March, visit Plymouth Laboratory; June, London Zoo or shops; July, a beach barbecue party and visit to Alexandra Palace; September, visit to a London Tropical Nursery. New members are welcome and should write to the Secretary, M. Abraham, 5 Cecil Road, Bournemouth, for full details. The President of the Society is Mr. J. Jeffery.

THE **Wrexham T.F.S.** held their annual dinner in December when the trophies were also presented. The results were as follows: The Endeavour Trophy: 1, F. Oliver, 60 points; 2, E. Gillam, 23 points; 3, J. Evans, 22 points. The Paramount Trophy (The Fish of the Year), F. Oliver. The Home Aquaria competition was won by F. Oliver and the highest pointed Junior award was awarded to Master M. Edwards. The society would welcome new members and anybody interested is invited to come along to the meetings at "The Fellowship Hall," Bradley Road, on the second and last Thursday of every month. The secretary is C. Pritchard, "Cregnoth," Middle Road, Nant, Coedpoeth, Nr. Wrexham.

THERE was a large attendance at the Annual Dinner and Dance of the **Hounslow and District A.S.** when the chairman of the Society, Ray Scurry, welcomed everyone and thanked them for their support throughout the year. He also made a presentation to Derek Woodward, the retiring Secretary, and thanked him for all the hard work he had put in during his many years as Secretary. Mr. Woodward was moving from the district to live in Sussex and would be greatly missed by his many friends in the Society. The results of the year's main Table Show were as follows: Barbs: 1, D. Love; 2, P. Copper; 3, H. Pratt. Livebearers: 1 and 3, A. Loveday; 2, R. Brooks. Labs: 1, D. Love; 2, J. Bannan; 3, A. Constantine. A.O.S.: 1 and 3, M. Collins; 2, D. Love. A.O. Seals and Loaches: 1 and 2, Mrs. R. Brewer; 2, M. Alexander. Cichlids: 1, A. Constantine; 2, R. Allum; 3, D. Love. Corydoras and Brochis: 1 and 2, H. Pratt; 3, A. Loveday. Characins: 1, K. Brooks; 2, D. Love; 3, M. Alexander. Goldwater: 1, and 2, A. Loveday; 3, H. Pratt. D.R. and W.C.M.M.: 1, D. Brooks; 2, K. Brooks; 3, J. Bannan. Paras: 1, D. Love; 2, K. Brooks; 3, J. Bannan. Best Hyphessobrycon: C. Turner. Furnished Jars: P. C. Copper. Plants: J. Bannan. Breeders (Egglayers): M. Alexander. Breeders (Livebearers): K. Brooks. Breeder of the Year: R. Allum. Home Furnished Aquaria: 1, J. White; 2, H. Parish; 3, P. Copper. Highest Points: H. Pratt. Junior Highest Points: K. Brooks. Best Fish of the Year: A. Loveday. Junior Home Furnished Aquaria: 1, R. Brooks; 2, Miss N. Brewer; 3, P. Copper. Visitors are welcomed to the meetings which are held at St. Stephens Church Hall, Whitton Road, Hounslow, at 8 p.m. on alternate Wednesdays. All enquiries should be sent to H. Parish, Hounslow and District A.S., The Barrons, Twickenham, Middlesex.

THE **Haven A.S.** held two successful meetings in December. At the first, the Society's Chairman, J. Buck, gave an informative and very entertaining talk on "Thirty Years of Fish Keeping"; and at the other meeting, all members told of "The mistakes made when they started keeping fish." New members, especially, found these to be very useful aids to better fishkeeping. Meetings during February will be on the 14th (Show: any egg-laying variety) and 28th (to

DISINFECT NEW PLANTS AND FISH WITH  **Hillside Aquatics London N12**

be arranged.) These will be at the Society's H.Q., 14 Pill Fold, Millford Haven, at 7.30 p.m. Visitors and new members are welcome at any meetings.

THE main item of the evening at the December meeting of the **New Forest A.S.** was a slide show, presented by G. Danby, on Gichlids. The colour slides were very good and the majority were very true showings of the fish colours. The Table Show was judged by Don Lane. Results: Corydoras Cats: 1 and 3, C. Knapp; 2 and 4, D. Harding. Mollies: 1, B. Higginson; 2, D. Harding; 3, R. Memmenet.

FROM **Medway A.S.** the change of officers for this year is announced as follows: Chairman: R. Mayne; Treasurer: C. A. Elliot; Secretary: Mrs. B. A. Marsh (297 Dale Street, Chatham, Kent); Show Secretary: J. Marshall (97 Dargets Road, Chatham, G37 1J). Meetings: second and fourth Wednesday, 8.00 p.m., Danecourt School, Watling Street, Gillingham (A2).

THE **High Wycombe A.S.** held their annual general meeting in December when officers elected for 1972 were: Chairman: R. Cox; Vice-Chairman: T. Wilkinson; Treasurer: T. Wilkinson; Secretary: J. Bushby; 3 Hawthorn Walk, Manor Farm Estate, Hazlemere, Bucks.; Committee: I. Pierce, D. Lynn and R. Baynton; F.B.A.S. Delegate: C. Pike; Three Counties Delegates: R. Cox and C. Cleave; Table Show Sec.: Olive Leslie; Librarian: D. Schramm; Equipment Officer: R. Cox; Show Manager: C. Pike; Show Secretary: R. Leslie, 29 Meadow Walk, Tylers Green, Bucks. Tel.: 4386.

ON Monday, 3rd January, the **Bournemouth A.S.** held its annual general meeting. The Chairman, B. Coombes, gave his report and thanked the Committee and members for their support during the previous year.

The Hon. Secretary, R. Matley, in making his report, spoke of the varied selection of programmes enjoyed by members during the year, including slide shows, talks, quizzes, discussions and social meetings with other societies. Members had been encouraged to take part in quizzes, all of which had proved highly successful. Several meetings had been arranged in conjunction with the Association of Southern Aquarists' Societies, all of which had been helpful in the running of inter-society functions.

The election of officers followed, and the results were: President: Jim Scott-Morgan; Chairman: R. Coombes; Secretary: R. Matley; Treasurer: L. James; Show Secretary: J. V. Jeffery; Committee: H. Earl, N. Walker, H. Greenhalgh and J. V. Jeffery, who is also P.R.O. Mr. Jeffery was elected to serve for a period of two years.

The Table Show results were: A.V. Platy: J. B. Watkins; 2 and 3, Mr. Fradley; 4, Mr. Haskins. The chairman declared the meeting closed at 10.15 p.m.

EARLY in January, **Carshalton and District A.S.** held their annual general meeting when the following officials were elected: Chairman, B. McConnell; secretary, K. Thomas; show secretary, C. Wilson; and two committee members, Miss S. Evans and J. Lucy. Four shields were donated by members to be awarded at the end of the year. In the December meeting

a bring-and-buy sale was held when fish and various items of equipment were auctioned.

ON the January meeting night of the **Horsforth A.S.**, Ray Hampson gave a very interesting slide and movie show. The slides and lecture were on the cultivation, etc., of keeping live daphnia, while the movie was on the subject of marines in the oceans, and underwater observation by divers. Also in the show were films of members' own tanks, taken several years ago.

The usual table show was held, with M. Orr and C. Coim taking most of the honours. Mr. Orr won the monthly trophy for the Best Fish in Show. New members made very welcome. Anyone interested, please contact the hon. secretary, Tel. Leeds 21025.

THE **Bradford and District A.S.** held its annual dinner in December and this was the highlight of the society's social year. The society invited Mr. and Mrs. Ron Winterburn as principal guests. Mr. Winterburn has given many hours of very valuable help to the running of the society, and his speciality was the annual dinner. The society also awarded him its highest award—life membership for his help. The results of the Thornley Memorial Trophy, the Sharpe Trophy and the Junior Plaque were: Thornley Memorial Trophy: 1, J. P. Chorley; 2, C. Binns; 3, G. Fairclough. Sharpe Trophy: 1, Mrs. W. Holmes; 2, A. Daugherty; 3, Mr. Soffley. Junior Plaque: 1, Master J. Moorhouse. The prize-winners at the British Aquarist Festival were also presented with their cards.

THE officers and committee for this year of **Belle Vue A.S.** are as follows: President, R. E. Legge; vice-president, S. Taylor; chairman, S. Heap; vice-chairman, P. Kenyon; secretary, R. Davies, 38 Wetherby Street, Higher Openshaw, Manchester 11 1WU; treasurer, Mrs. M. Cobb; show secretary, C. Thacker, 3 Rathen Road, Withington, Manchester, 20; magazine editor, Mrs. W. Heap; committee, Mrs. J. Shackleton, B. Haslam, H. Shackleton, H. Townley; junior representative, Master Roger Barnaby.

THE **Anson Aquatic Club** held their annual general meeting in December and the new committee is now as follows: Chairman, A. Wood; secretary, A. Taylor, 23 Priory Park Road, Wembley; treasurer, Mrs. R. Howe, 103 Village Way, Neasden, N.W.10; show secretary, T. Butler, 10 Poplars Avenue, N.W.2; vice-chairman, P. Watson; assistant show secretary, B. Bullock; two co-opted members, L. Branist, D. Baggott. After the election of the committee there was an interesting discussion on the year's programme. Club winners for 1971 were: 1, D. Riley; 2, D. Howe; 3, A. Wood; 4, L. Branist. Meetings are held every Wednesday 7.30 p.m. to 10.30 p.m. at Anson Hall, Anson Road, Cricklewood, N.W.2. All visitors welcomed.

THE **British Marine Aquarist Association** December Meeting was well attended and the night began with a general talk. The society now has a link with two clubs that go deep sea fishing. The Endeavour Deep Sea Group and the Wulfruna Sub Angling Group and this should be of great assistance.

THE **Rotherham and District A.S.** held their all-winners show in November. Prizes were presented by Albert Lindley, who afterwards answered members' questions on fish keeping. The cups and plaques were presented as follows: First in the all Year Winners was Master David Airton, second being Derek Jones, and third Master D. Airton. A.O.V. Section: 1 and 2, Derek Jones, 3, David Airton. The Brooders "Variety" prize was won by Derek Jones with nine different species of fish to his credit.

ONLY one meeting was held in December by **Grimsby and Glee Society**, when members were entertained by a tape and slide show, on catching fish for keeping in the tanks at home. Table Show results: Large Barbs: 1 and 2, R. Jennings; 3, L. Evans. Killies: 1 and 3, J. Clovis; 2, L. Dearden. Fighters: 1, J. Dawson. Mollies (Pairs): 1, T. Walker; 2 and 3, J. Grant. Loaches: 1, L. Dearden; 2, C. Haston; 3, R. Jennings.

OFFICIALS of the **Chesterfield and District A.S.** for this year are as follows: President, P. Bates; chairman, T. Silvers, Tel. Staveley 3461; secretary, M. Murfin, 38 Jawbones Hill, Chesterfield; show secretaries, D. Stone, R. Kerry; treasurer, Mrs. B. Gabe. Meetings held at "Red Lion," Vicker Lane, Chesterfield, at 7.30 p.m. on the first Thursday of every month. All interested aquarists will be welcome at these meetings.

AT the December meeting of the **Lincoln and District A.S.**, Hans Kuhn, one of the Society members, gave a very interesting lecture on "Breeding in the Community Tank." Also held at this meeting was a raffle with ten prizes.

SECRETARY CHANGES

Yate and District A.S.: T. J. Green, 185 Station Road, Kingswood, Bristol.

Ashton-under-Lyne and District A.S.: F. Warburton, 113 Hope Street, Dukinfield, Cheshire, SK16 4ND; show secretary, D. Trace, 25 Borrowdale Crescent, Ashton-under-Lyne.

Boston A.S.: S. Noble, 175 Wood Farm Road, Boston, Lincs.

Gloucester A.S.: R. Walker, 41 Hailes Road, Coney Hill, Gloucester.

W.K.F.B. A.S.: R. J. Healey, 2 Lawnside Close, Coleshill, Birmingham, B46 1BS.

High Wycombe A.S.: J. Bushby, 3 Hawthorn Walk, Manor Farm Estate, Hazlemere, Bucks. Tel: Penn 2830.

Merseyside A.S.: B. T. Hall, 122a Roughsedge Hey, Cantril Farm, Liverpool, L28 1RY. Tel: 051-689 8613.

OBITUARY: It is with regret that we announce the death on 20th December 1971 of Mr. H. Sumner, president and founder member of the **Chingford and District A.S.** "Bert" will be greatly missed by his club and for his activities in Essex, North and East London Aquarist Association.

AQUARIST CALENDAR

1972

12th February: Rotherham and District A.S. Third Open Show at Brinsworth Manor School, Brinsworth Lane, Brinsworth. Details and schedules from the Secretary, Mrs. Harrison, 35, Osbert Road, Broom, Rotherham.

5th March: Keighley A.S. Annual Open Show, Victoria Hall, Keighley.

12th March: Belle Vue A.S. Open Show, Openshaw Lads Club, Crossley House, Ashton Old Road, Openshaw, Manchester. Details from Mr. R. Davies, 38 Wetherby Street, Higher Openshaw, Manchester, 11.

19th March: Top Ten A.S. Open Show to be held at Huddersfield Town Hall.

26th March: Worsop A. and Z.S. Annual Open Show at the same venue as last year North Notts. College of Further Education, Blyth Road, Worsop. Schedules available shortly from the Show Secretary, Mr. F. G. Sibson, 17 Clinton St., Worsop.

 **A TABLET
A DAY, SENDS
WHITE SPOT AWAY**
Hillside Aquatics London N12

26th March: East Dulwich A.S. Third Open Show. To be held in the Territorial Army Hall at Highwood Barracks, Lordship Lane, S.E.22. Show secretary, K. G. Quennell, 43a Camden Road, Peckham, S.E.15 3UB.

26th March: Nelson A.S. Annual Open Show will be held at "The Civic Centre," Stanley Street, Nelson. Details from E. McKenna, show secretary, 52 Bath Street, Nelson, Lancs, BB9 0NP.

2nd April: Hyde A.S. Open Show.

3rd April: Southampton and District A.S. The Avenue Hall, Southampton.

3rd April: Tottenham and District A.S. Silver Jubilee Open Show at the Haringey Sports Council, Drill Hall, High Road, Tottenham, N.17 (opposite the Spurs Ground). Schedules from Show Secretary, K. Massey, 72 Westward Road, South Chingford, E.4. Tel.: 527-7851.

8th April: Houghton and District A.S. One-day Open Show, Philadelphia Welfare Hall, Houghton Burn. Schedules available in February from C. A. Fairlight, 27 Longrose, Houghton-le-Spring, Co. Durham.

8th April: Sheffield and District A.S. Open Show at the Granville College, Granville Road (near the Railway Station), Sheffield, 1.

9th April: Stockton-on-Tees A.S. Seventh Annual Show at St. Peter's and Paul's School (off Durham Road, A177), Stockton-on-Tees. Schedules available from Show Secretary, M. Merrifield, 15 York Crescent, Billingham, Teesside.

15th April: Bath A.S. Open Show. St. Peter's Hall, Dorset Street, Bath. Schedules available from show secretary, S. Daniels, 21 Haycombe Drive, Whiteway, Bath.

16th April: Medway A.S. Open Show. Details later.

16th April: Medway A.S. Open Show. St. John Fisher School, Ordnance Street, Chatham, Kent (1 min. Chatham Station). Schedules from J. Marshall, 97 Dargers Road, Chatham, Kent. Phone Medway 63712.

22nd April: Thurrock A.S. Open Show. New venue, Park School, Beldge Road, Grays, Essex. Details from show secretary, D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea.

22nd April: Independent A.S. Open Show will be held in the Public Hall, Islington Town Hall, Upper Street, Islington, N.1. Schedules from the show secretary, E. Islip, 85a Colneyhatch Lane, London, N.10.

23rd April: York and District A.S. Details later.

23rd April: Freeland A.S. Open Show at St. Stephens Hall, Surrey Square, S.E.17. Details from J. Stamp, 72 Redman House, Lant Street, SE1 1QW (407 4666).

29th April: Uxbridge and District A.S. New venue, The G.P.O. Motor Repair Depot, Willow Tree Lane, Yeading Lane, Yeading, Hayes, Middlesex. Full particulars available from the show secretary, N. V. Lee, 46 Airedale Road, Ealing, London, W5 4SD.

30th April: Coventry Pool and Aquarium Society Open Show, Foleshill Community Centre, Foleshill Road (A444), Coventry. Details later.

30th April: Stratford and District A.S. Annual Open Show at the A.E.L. Club, Moss

Road, Stratford. Details from A. Stear, 63 Derbyshire Lane, Stratford, Manchester. 061-865 3423.

30th April: Ilfracombe and District A.S. First Open Show will be staged under F.B.A.S. rules, etc., at the Holiday Inn on the sea front, Ilfracombe.

7th May: Oram Open Table Show, Recreation Hall, Refuse Street, Shaw, Oldham.

7th May: Dukeries A.S. Open Show at the Winifred Portland Technical Grammar School, Sparken Hill, Worksop. Show secretary, M. Woodley, 20 Park Street, Worksop.

7th May: Ashton-under-Lyne and District A.S. Annual Open Show. The venue, Dukinfield Town Hall, King Street, Dukinfield.

13th May: Southend, Leigh and District A.S. Open Show, St. Clements Hall, Leigh-on-Sea (not 20th May as previously stated). Show secretary, R. D. Orford, 8 Blenheim Chase, Leigh-on-Sea, Essex.

13th May: Trowbridge and District A. & P.S. seventh Annual Open Show will be held at the Nelson Haden Girls School, Trowbridge. Schedules available from show secretary, W. S. Boston, 17 Polebarn Road, Trowbridge, Wilt.

14th May: Derby Regent A.S. Open Show, Sherwood Foresters Recreation Centre (Normanton Barracks), Osmaston Park Road (A5111), Derby (follow R.A.C. signs). Show Sec.: R. G. Harlow, 180 Mansfield Road, Derby. Tel: 44322.

14th May: Gloucester A.S. first Open Show at the Education and Leisure Centre, Painewick Road, Gloucester. Schedules from secretary, R. Walker, 41 Hailes Road, Coney Hill, Gloucester.

14th May: Merseyside A.S. Open Show, The British Legion Club Ltd., Holyoake Hall, 2 Cranford Avenue, Liverpool, L18 1EG.

21st May: Yeovil & D.A.S. Open Show, The School Hall, Church Street, Martock, Nr. Yeovil. Show Manager: Mr. D. Phinn, 5 Hill Terrace, Bowerhinton, Martock, Somerset.

21st May: Croydon A.S. (F.B.A.S.) Open Show. Provisional Date. Full details later.

28th May: Corby and District A.S. Open Show. Sunday, Corby Civic Centre. Further details will be available shortly.

28th May: Boston A.S. Open Show, Blackfriars Theatre, Spayne Lane, Boston, Lincs. Details from S. Noble, 175 Wood Farm Road, Boston, Lincs.

4th June: Accrington and District A.S. Annual Open Show. Details later.

4th June: South Derbyshire and District A.S. Annual members show—details later.

4th June: Castleford and District A.S. Annual Open Show at Garsington Community Centre, Carlston, Pontefract, Yorks. Details from secretary B. Stevens, 72 Falcon Drive, Love Lane, Castleford, Yorks, or phone Mrs. Gates, Pontefract 3213.

4th June: Bournemouth A.S. Annual Open Show to be held at Kinson Community Centre, Pelhams Park, Kinson, Bournemouth. Entry forms and schedules available after 1st May from Show Secretary, J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth, BH6 4JP. No entries will be accepted at the door.

10th June: Llanrwst Major A.S. Annual Show. The address of the show secretary is A. Ibbertson, 84 St. Mary's Avenue, Barry, Glam.

11th June: Thorne A.S. Open Show is to be held in the Thorne Grammar School. All information to H. C. Jewison, 94 Hawthorne Road, Thorne, nr. Doncaster.

11th June: Bishops Cleeve A.S. Third Open Show at the Tyde Barn, Bishops Cleeve on the A435, Cheltenham to Evesham Road. Show schedules will be obtainable from the show secretary, Mrs. M. Scriven, 27 Warden Hill Road, Cheltenham, Glos.

11th June: High Wycombe A.S. Annual Open Show at Lane End Hall, Lane End, High Wycombe.

11th June: Warwick County Fire Brigade A.S. Open Show at the Town Hall, High Street, Colehill. Details will be available after 1st April from R. J. Tromans, 27 Mezzell Road, Kingshurst, Birmingham, tel: 021-769 7543.

18th June: Swillington's Seventh Open Show. Details later.

24th June: Anson Aquatic Club Annual Show. Details later.

25th June: Alfreton and District A.S. Annual Open Show to be held at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, B. Hocking, 15 Meadow Close, Eastwood, NG16 3JQ.

25th June: Gosport and District A.S. Open Show will be held at the Crofton Community Association, Stubbington.

2nd July: Exeter and District A.S. first Open Show, Kenford Village Hall, Exeter. Beging by 12 noon. Show schedules and entry forms available from the secretary, W. F. Bye, 14 Bearweithy Close, Exeter, EX2 9LR. Tel: Exeter 78936.

2nd July: North Warwickshire A.S. Open Show. The Settlement, Kingstanding Road, Kingstanding, Birmingham. Details from T. Stow, 108 South Road, Erdington, Birmingham, 23.

4th July: GKN Pond and A.S. Open Show at GKN Canteen, Salisbury Street, Darlaston, Staffs. Further show details available from Ken Rowley, hon. show secretary, 156 Wolverhampton Street, Darlaston, Staffs. Directions can be obtained from A. Wright, 94 Blaxwick Road North, Short Heath, Willenhall, Staffs.

8th July: Basingstoke A.S. Open Show. Carnival Hall, Basingstoke. Schedules from M. Strange, 10 Loddon Court, Neville Close, Basingstoke.

26th August: Plymouth District Aquarist and Pondkeepers Society Open Show at Y.M.C.A., Plymouth.

2nd September: Bethnal Green A.S. Open Show. Full details later.

16th September: Havant and District A.S. Second Annual Open Show will take place at the Devereil Hall, Purbrook. The show secretary is V. B. Hunt, "Caeglas," 120 London Road, Widley, nr. Portsmouth, Hants.

16th September: Hounslow and District A.S. Open Show at Hounslow Youth Centre, Cecil Road, Hounslow.

24th September: Torbay A.S. Annual Open Show will be held at The Torquay Town Hall. Full details will be advised later.

14th-15th October: British Aquarists Festival, Belle Vue Zoological Gardens, Manchester.

22nd October: Sherwood A.S. Details later. Show secretary, J. Igoe, 25 Marples Ave., Mansfield-Woodhouse, Notts.

28th October: Doncaster and District A.S. Third Open Show.

**Help For
Society
Secretaries!**

★ As Specialist Show Printers we supply: Entry Forms, Schedules, Catalogues, Tickets, Badges, Tank Labels, Price Cards, Stationery, Rosettes etc.

● Write now for catalogue and price list.

REGENT (PRINTERS) LTD.
Wakefield Road, Aspley,
HUDDERSFIELD HD5 9AA
Phone: 0484-30919